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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

PRELIMINARY ANNOUNCEMENT OF THE PHILADELPHIA MEETING

Edited by Dr. F. R. MOULTON

PERMANENT SECRETARY

THE one hundred seventh meeting of the association will be held in Philadelphia from next December 27 to January 2, inclusive. The association was born in Philadelphia on September 20, 1848, and the coming meeting will be its sixth meeting in the city of its birth.

The march of progress of the association and of science is measured roughly by the following data concerning the six Philadelphia meetings, the registration and the number of papers at the approaching meeting being necessarily estimates. The stated membership of the association in 1940 is as of September 30.

Year	Registration	Papers Read	Membership
1848	.....	60	461
1884	1,261	305	1,981
1904	890	224	4,041
1914	.....	774	8,325
1926	3,181	1,449	14,366
1940	4,000	2,200	21,067

REGISTRATION

Registration headquarters will be in Convention Hall, about a block from the major buildings of the University of Pennsylvania where more than half of the general addresses and scientific sessions of the meeting will be held. Branch registration desks will be located in the Bellevue-Stratford and Benjamin Franklin Hotels. A visible directory of all registered persons and their Philadelphia addresses will be available throughout the meeting at the Bellevue-Stratford Hotel.

Each person registering will receive a General Program of the meeting, a book of more than 300 pages which will contain complete information concerning hotel headquarters for all sections and societies, a schedule of dinners and luncheons, announcements of entertainments and social features, a brief description of the science exhibition, complete scientific programs of all sections and societies, an index of all persons appearing on the programs, etc. Each person registering will receive also a badge of admission to all general sessions and to all programs of technical papers. Admission to certain functions, such as the Biologists' Smoker, will be limited to those having registration badges or registration cards.

Hotels and Headquarters

General Headquarters: Bellevue-Stratford Hotel.

Headquarters of the sections of the Association and of the affiliated societies meeting with the Association in Philadelphia are as follows:

Bellevue-Stratford, Broad and Walnut Sts.: All sections of the Association except B, C, D, F, G, H, and O, Association of Symbolic Logic, American Society of Parasitologists, American Science Teachers Association, Society of the Sigma Xi, Phi Beta Kappa, Pi Gamma Mu, Gamma Alpha, Sigma Delta Epsilon, Metric Association, American Philosophical Association, Research Council on Problems of Alcohol, American Association of Scientific Workers. *Rates: with bath—single, $3.50–$6; double, $5–$8.

Adelphia, 13th and Chestnut Sts.: Ecological Society of America, Limnological Society of America, Society of American Foresters. Rates: with bath—single, $3.50–$5; double, $5–$8.

Benjamin Franklin, 9th and Chestnut Sts.: Sections on Physics, Zoological Sciences, Botanical Sciences and Agriculture, American Physical Society, American Association of Physics Teachers, Sigma Pi Sigma, American Society of Zoologists, American Association of Economic Entomologists, Entomological Society of America, Botanical Society of America, American Society of Plant Physiologists, American Society of Naturalists, Genetics Society of America, American Microscopical Society, Sullivant Moss Society, American Fern Society. Rates: with bath—single, $3.50 up; double, $5 up.

Normandie, 36th and Chestnut Sts.: American Society for Horticultural Science, Potato Association of America, American Meteorological Society. *Rates: with bath—single, $3 up; double, $5 up.

Philadelphian, 39th and Chestnut Sts.: American Phytopathological Society, Mycological Society of America. Rates: with bath—single, $2.50–$5; double, $4–$8.

Ritz-Carlton, Broad and Walnut Sts.: Section on Chemistry, American Nature Study Society. *Rates: with bath—single, $3.50–$5; double, $6–$10.

Robert Morris, 17th and Arch Sts.: Section on Astronomy, American Astronomical Society, National Association of Biology Teachers. Rates: with bath—single, $2.50–$4; double, $4–$6.

Stephen Girard, 2027 Chestnut St.: Section on Anthropology, American Anthropological Association. Rates: with bath—single, $2.50–$3.50; double, $4–$6.

Other Hotels in Philadelphia

Barclay, Rittenhouse Square, E.: Rates: with bath—single, $4.50–$8; double, $7–$10.

Belgravia, 1811 Chestnut St.: Rates: with bath—single, $3–$4; double, $5–$8.

Drake, 1512 Spruce St.: Rates: with bath—single, $3.50–$4; double, $6–$7.

McAlpin, 10th St. at Chestnut: *Rates: with bath—single, $2.25–$2.75; double, $4–$5.

Rittenhouse, 22nd and Chestnut Sts.: *Rates: with bath—single, $2.50 up; double, $3.50 up.

St. James, 13th and Walnut Sts.: Rates: with bath—single, $2.75–$4; double, $4.50–$6.

Spruce, 13th and Spruce Sts.: Rates: with bath—single, $1.75–$2.50; double, $2.50–$3.75.

Sylvania, Juniper and Locust Sts.: Rates: with bath—single, $3–$5; double, $5–$7.

Tracy, 36th St. above Chestnut: *Rates: with bath—single, $2–$2.50; double, $3–3.50.

Walton, Broad and Locust Sts.: *Rates: with bath—single, $2.50–$4; double, $4–$8.

Warburton, 20th and Sansom Sts.: *Rates: with bath—single, $3; double, $5.

Warwick, 17th and Locust Sts.: Rates: with bath—single, $4.50–$5.50; double, $7–$8.

Wellington, 19th and Walnut Sts.: Rates: with bath—single, $4–$5; double, $6–$8.

Transportation

Philadelphia is readily accessible by railroads, planes and buses. Holiday rates will probably be in effect on all railroads during the period of the meeting. Information respecting these special reduced rates should be obtained from local agents of the transportation companies.

The regular (not reduced) round-trip railway and airplane fares to Philadelphia from representative cities are as follows:

	Railroad fare	Pullman fare	Airplane fare
Atlanta	$36.70	$12.10	$ 78.80
Boston	21.00	5.30	29.30
Chicago	44.70	11.60	72.26
Cleveland	27.50	6.30	41.76
Minneapolis	63.05	16.90	99.76
New Orleans	58.50	18.90	125.10
St. Louis	52.30	14.20	87.66

By special arrangement, the Yellow Cab Company of Philadelphia will have on sale at the various hotels strips of four tickets for $1.00 which will be honored between any centrally located hotel and the University

* Hotel has single and double rooms without bath. The Y.M.C.A., 1421 Arch Street, can provide rooms without bath for men only or for married couples. A small number of rooms are available at the Y.W.C.A., Crozer Hall, 2039 Cherry Street, and at the Central Branch, 1800 Arch Street.

of Pennsylvania or Convention Hall, the fare for one person being two tickets and for more than one person one ticket each. The Philadelphia Rural Transit Company will provide bus service over a route of easy access from all central city hotels at a round-trip fare of 25 cents on special schedules to meet the varying demands of those attending the scientific sessions that will be held at the University of Pennsylvania. In addition, street cars out Walnut Street go on Woodland Avenue near the principal buildings of the university. The walking time from the Bellevue-Stratford Hotel to Irvine Auditorium, near the center of the university buildings, is about 30 minutes.

OFFICIAL MEETINGS

The Executive Committee of the Council will meet at 4:00 P.M. on Thursday, December 26, in the permanent secretary's rooms in the Bellevue-Stratford Hotel, and thereafter as it shall determine.

The Council of the association will meet at 2:00 P.M. on Friday, December 27, in the Junior Room of the Bellevue-Stratford Hotel, and thereafter as it shall determine.

The Academy Conference will be held on Friday, December 27, in the Junior Room of the Bellevue-Stratford Hotel at 3:30 P.M., or immediately after the adjournment of the council. The conference will be followed by a complimentary dinner to one representative of each affiliated academy and to designated representatives of the association. Since the address of the retiring president will be delivered on the same evening, the dinner will begin at 6 o'clock.

The Secretaries Conference will begin with a dinner in the Bellevue-Stratford Hotel at 6:00 P.M. on Sunday, December 29, and will be followed by the discussion program.

ANNUAL SCIENCE EXHIBITION

The annual science exhibition will be held in Convention Hall from 10:00 A.M. on Friday, December 27, to 1:00 P.M. on Tuesday, December 31. In general, the exhibition will be open from 10 A.M. until 6 P.M., but on Friday it will be open until 8 P.M. so that it may be conveniently visited before the presidential address of Dr. Walter B. Cannon, which will be delivered in the Auditorium of the same building.

GENERAL SESSIONS

All evening general sessions, except the address of Dr. Walter B. Cannon, will be held in Irvine Auditorium, which is located at the northwest corner of Spruce and 34th Streets, on the grounds of the University of Pennsylvania.

On Friday, December 27, at 8:15 P.M., Dr. Walter B. Cannon, George Higginson professor of physiology in Harvard Medical School, will deliver his address as retiring president of the American Association for the Advancement of Science on "The Body Biologic and the Body Politic."

On Sunday, December 29, at 8:15 P.M., Walter Lippmann, author, editor and columnist, will deliver the sixth annual Phi Beta Kappa lecture in Irvine Auditorium.

On Monday, December 30, at 4:30 P.M., Dr. Edmund Ezra Day, president of Cornell University, will deliver the second annual Phi Kappa Phi address in Irvine Auditorium on "The Discipline of Free Men."

On Monday, December 30, at 8:15 P.M., Dr. Anton Julius Carlson, emeritus Frank P. Hixon professor of physiology in the University of Chicago, will deliver the nineteenth annual lecture under the joint auspices of the American Association for the Advancement of Science and the Society of the Sigma Xi. The subject of Dr. Carlson's lecture is "Science versus Life."

ENTERTAINMENT, LUNCHEONS AND DINNERS

The Local Committee will hold a reception for the officers and members of the association and their guests in the Ball Room in Convention Hall, immediately following the address of Dr. Walter B. Cannon on Friday evening, December 27.

The Local Entertainment Committee is planning a tea and music for registrants at the meeting from 3:30 to 6:00 on Sunday afternoon, December 29, in Exhibition Hall.

The American Society of Naturalists, in cooperation with other biological societies and with the association, will hold the Annual Biologists' Smoker at 9:30 P.M. on Monday, December 30. Admission to the smoker will be limited to persons registered for the meeting.

Section on Physics, the American Physical Society and the American Association of Physics Teachers will hold a joint dinner on December 27.

Sigma Pi Sigma will hold a luncheon on Friday, December 27.

Section on Chemistry will hold a dinner on Friday, December 27.

Section on Astronomy and the American Astronomical Society will hold a joint dinner on Tuesday, December 31.

Section on Geology and Geography will hold a smoker at Bryn Mawr College on Saturday, December 28, under the auspices of its Department of Geology.

Section on Zoological Sciences and the American Society of Zoologists will join in their annual dinner for all zoologists on Tuesday, December 31.

The American Association of Economic Entomolo-

gists and the Entomological Society of America will hold their annual entomologists' dinner on Saturday, December 28.

The American Society of Parasitologists' luncheon will be on Tuesday, December 31.

Section on Botanical Sciences and affiliated societies will hold the annual dinner for all botanists on Tuesday, December 31.

American Phytopathological Society's annual dinner will be on Saturday, December 28.

American Society of Plant Physiologists will hold its annual dinner on Monday, December 30.

The Ecological Society of America's annual dinner will be held on Saturday, December 28.

The Genetics Society of America will hold its annual luncheon on Tuesday, December 31.

The Section on Anthropology and the American Anthropological Association will join in a dinner on Saturday, December 28.

The Sections on Psychology and Education will hold a joint dinner on Monday, December 30.

The Subsection on Dentistry of the Section on Medical Sciences will hold a luncheon on Saturday, December 28.

Pi Gamma Mu will hold its annual luncheon on Tuesday, December 31.

Sigma Delta Epsilon will hold a luncheon for all women in science on Friday, December 27.

Section and Society Programs

In addition to the 15 sections of the association, about 40 affiliated and associated societies will participate in the meeting. The programs of some of the sections and participating societies are not yet available.

The Section on Mathematics and Affiliated Societies (*Dec. 27–28*) will hold sessions on Friday morning and afternoon and a joint session with the Association for Symbolic Logic and the Eastern Division of the American Philosophical Association on Saturday morning.

The Section on Physics and Affiliated Societies (*Dec. 26–30*). The program of the American Physical Society will begin on Thursday morning, December 26. The Section on Physics, the Section on Geology and Geography and the American Physical Society will hold a joint session on Friday morning on "Some Applications of Physics to the Earth Sciences." Papers will be read by L. Don Leet, Chester R. Longwell, William D. Urry and Robert E. Horton. On Friday afternoon the section will hold a joint session with the American Physical Society and the American Association of Physics Teachers, at which John Zeleny, president of the American Physical Society, will deliver an address on "Ions as Gases," and Ernest O. Lawrence, retiring vice president for the Section on Physics, will speak on "Higher Energies." The third paper of the session will be by Robley D. Evans on "Applications of Nuclear Physics." On Friday evening the section and the two affiliated societies will have a joint dinner at which the Duddell Medal of the Physical Society of London will be presented by the British Ambassador, Lord Lothian, to Ernest O. Lawrence.

On Saturday morning the American Association of Physics Teachers will hold a session for contributed papers on "Demonstrations and Laboratory Equipment"; and in the afternoon a session for invited papers on "Medical Physics." On Sunday the society will visit the annual science exhibition in Convention Hall and the laboratories of physics of Bryn Mawr, Haverford and Swarthmore colleges.

On Monday morning the American Association of Physics Teachers will hold a joint session with the American Science Teachers Association for the presentation of the Oersted Medal and for witnessing a demonstration lecture on television. On Monday afternoon the society will hold a session for the presentation of contributed papers on the method and the philosophy of teaching and on related subjects.

The Section on Chemistry (*Dec. 27–30*). The program of the section will consist of two sessions on each of three days—Friday, Saturday and Monday. On Friday the program will be a symposium on "Organometallic Compounds," which will be introduced by Henry Gilman, retiring chairman of the section. Other participants will be Avery A. Morton, Edgar C. Britton, A. V. Grosse, Charles P. Smyth, Robert A. Kehoe and George Calingaert. Following the dinner of the section in the evening, Dr. Gilman will deliver his address as retiring vice president of the association on "Some Biological Applications of Organometallic Compounds."

At the sessions on Saturday a group of invited and carefully selected contributed papers will be presented, the first of which will be on "Sulfathiozole and Sulfapyridine," by George W. Raiziss, of the Abbott Dermatological Research Laboratories.

On Monday, under the leadership of C. A. Browne, of the U. S. Department of Agriculture, the program will be a symposium organized in commemoration of the hundredth anniversary of the publication of Liebig's celebrated book on "Organic Chemistry in its Applications to Agriculture and Physiology," and presented at joint sessions with the Section on Agriculture. The several participants in this symposium will present the influence of Liebig and his pupils on various branches of agricultural science, such as soils, fertilizers, plant physiology, enzymology, crop production and animal nutrition, and their present states.

It is expected that the papers of this symposium will be of such a high order of merit that they will be published by the association as a monograph.

All meetings and functions of the section will be held in the Ritz-Carlton Hotel. Sessions will be arranged so that it will be convenient for the members to visit the science exhibition and to attend some of the general addresses. Chemists who are not members of the association may attend the sessions of the section by paying the registration fee of one dollar.

The Section on Astronomy and the American Astronomical Society (*Dec. 30–31*). The section will hold joint sessions with the American Astronomical Society throughout Monday and Tuesday at the Franklin Institute. At the close of the session on Monday afternoon there will be an official welcome at the University of Pennsylvania and a tea at the Flower Observatory, followed by a visit to the Cook Observatory. On Monday evening there will be a special demonstration at the Fels Planetarium and an inspection of the Astronomical Section of the Franklin Institute.

Tuesday will be devoted to sessions for the presentation of papers. The address of Everett I. Yowell, chairman and vice president for the Section on Astronomy, will be on "Motions of the Stars." On Tuesday evening the section will join with the American Astronomical Society in its annual dinner.

The Section on Geology and Geography (*Dec. 27–30*) will hold eight sessions, starting on Friday morning and ending on Monday afternoon. The program of the first session will be a joint symposium by the Section on Geology and Geography, the Section on Physics and the American Physical Society on "Some Applications of Physics to the Earth Sciences." On Friday afternoon there will be a session on the geology of the Atlantic Coastal Plain, with a series of papers on the Cretaceous-Tertiary problem.

In joint sessions with the Geological Society of America, the section will devote Saturday and Sunday to "Appalachian Geology." A special feature will be a symposium on "Igneous Phenomena in the Appalachians," arranged by the Philadelphia Geological Society. In connection with this symposium Harry H. Hess, retiring president of the society, will deliver an address on "The Appalachian Peridotite Belt."

The retiring chairman of the section, Kirk Bryan, will deliver his vice presidential address at Bryn Mawr College on Saturday evening, on "The Geologic Antiquity of man in North America." At the conclusion of Dr. Bryan's address, there will be a smoker under the auspices of the Department of Geology of Bryn Mawr College.

Monday has been set aside for a joint meeting with the Association of American Geographers. The program will include a few general papers, but will be concerned primarily with the geography of national defense. Special map exhibits are being arranged to illustrate this topic, as well as the historical development of the Philadelphia district. There will also be an exhibit of areal photographs and mosaics, with special reference to the Atlantic Coastal Plain.

The Section on Zoological Sciences (*Dec. 31*) will hold a business meeting on Tuesday noon and a joint dinner with The American Society of Zoologists on Tuesday evening, at which Leon J. Cole, vice president for the section, will deliver his retiring address on "Each after His Kind."

The American Society of Zoologists (*Dec. 30–31, Jan. 1*), on Monday afternoon, will hold a special joint session with The Ecological Society of America on "Population Problems in Protozoa," at which six papers will be presented, the speakers being Lorande L. Woodruff, G. Evelyn Hutchinson, Richard P. Hall, Willis Johnson, W. H. Taliaferro and W. C. Allee.

A second special session will be held on Tuesday morning on "The Endocrine Control of the Mammalian Reproductive Cycle," at which papers will be read by Frederick L. Hisaw, William C. Young and Edwin B. Astwood.

A third special program will be presented at a joint session with The American Society of Naturalists on Wednesday afternoon on "Experimental Control of Development and Differentiation." The large general programs of the society of 300 or more papers will be arranged under its various sections as usual.

American Association of Economic Entomologists and The Entomological Society of America (*Dec. 27–30*). In addition to sessions for the presentation of general papers, the societies, on Friday afternoon, will join in a symposium on "The Breeding of Cultivated Plants Resistant to Insect Attacks." The participants include R. O. Snelling, J. G. Bigger, C. M. Packard, S. F. Bailey and R. H. Painter. On Saturday evening the societies will join in their annual dinner.

Harry S. Smith, president of the American Association of Economic Entomologists, on Friday morning will deliver his presidential address on "The Segregation of Insect Populations into Races and its Significance in Applied Entomology."

R. E. Snodgrass will deliver the annual public address of The Entomological Society of America on Friday evening, his subject being "The Evolution of the Arthropods." On Monday morning the society will hold a joint session with the Ecological Society of America on "Insect Ecology."

The American Society of Parasitologists (*Dec. 30–Jan. 1*) is one of the sponsors of the symposium on "Human Malaria" (Section on Medical Sciences). On Tuesday morning David H. Wenrich, president of the society, will deliver an address on "The Morphology

of Some Protozoan Parasites in Relation to Microtechnique." The society will hold a luncheon on Tuesday noon and a demonstration program of 31 papers will be presented on Tuesday afternoon. The program, consisting of 77 papers and demonstrations, is the largest in the history of the society.

The Section on Botanical Sciences and Affiliated Societies (*Dec. 28*). On Saturday afternoon the section will hold a joint session with its affiliated societies, the program of which will consist of the address of the retiring vice-president for the section, Neil E. Stevens, and of invited papers. The title of Dr. Stevens's address is "Botanical Research by Unfashionable Technics." The invited papers are "Comparative Studies on the Structure of the Shoot Apex in Seed Plants," by Adriance S. Foster, "Plants and Exchangeable Calcium of the Soil," by William A. Albrecht, and "Chlorophyll as a Part of the Photosynthetic Mechanism," by O. L. Inman.

The Botanical Society of America (*Dec. 30–Jan. 1*) will hold sessions of its four sections on Monday, Tuesday and Wednesday. On Tuesday morning the Physiological Section will join with the American Phytopathological Society and the American Society of Plant Physiologists for a session on "Physiological Aspects of Plant Diseases." In the afternoon the same section will participate in a joint session with the American Society of Plant Physiologists and the American Society for Horticultural Science to discuss "Selected Aspects for Plant Nutrition."

On Wednesday morning the society will join the Genetics Society of America and the American Society for Horticultural Science in a symposium on "Polyploidy." On Wednesday afternoon it will join the American Society of Naturalists for a symposium on "Experimental Control of Development and Differentiation."

The annual dinner for all botanists will be held on Tuesday evening, at which Carl M. Wiegand, retiring president of the society, will deliver an address.

The American Phytopathological Society (*Dec. 27–31*) will participate in six joint sessions, hold one symposium and two special conferences. In addition, it will hold one demonstration session on Sunday afternoon. The annual dinner of the society will be on Saturday evening.

The society will hold a joint session on Saturday with the Section on Botanical Sciences; on Monday morning, with the American Association of Economic Entomologists; on Tuesday morning, with the Ornamental Section of the American Society for Horticultural Science, and also with the Physiological Section of the Botanical Society of America and the American Society of Plant Physiologists; and on Tuesday afternoon, with the Mycological Society of America, and also with the Potato Association of America. On Monday evening the society will hold a symposium on "Better Undergraduate Training for Future Plant Pathologists."

The American Society of Plant Physiologists (*Dec. 28–31*), in addition to a joint session with the Section on Botanical Sciences on Saturday, will hold two symposia, one on Monday on "The Structure of Protoplasm" and one on Tuesday afternoon in collaboration with the American Society for Horticultural Sciences and the Botanical Society of America on "Plant Nutrition." The participants in the symposium on the "Structure of Protoplasm" are Laurence S. Moyer, Charles Hock, George Scarth, O. L. Sponsler, Warren H. Lewis, Douglas A. Marsland, Noburo Kamiya, C. L. Huskins and William Seifriz.

The society will hold joint sessions with the American Phytopathological Society on Tuesday morning and with the Society of Naturalists on Wednesday afternoon. At the annual dinner of the society on Monday evening, J. W. Shive will deliver a combined Stephen Hales-presidential address on "Significant Roles of 'Trace' Elements in the Nutrition of Plants," and at the same session, the recipients of the Charles Reid Barnes and the Stephen Hales awards will be announced. A special session on the teaching of plant physiology will be held on Tuesday evening. General sessions will be held on Monday afternoon, Tuesday morning and Wednesday morning and afternoon.

The Mycological Society of America (*Dec. 28–31*) will hold a joint session with the Section on Botanical Sciences on Saturday, and on Monday afternoon a joint session with the American Phytopathological Society. General papers will be presented at sessions on Saturday, Monday and Tuesday mornings. The principal feature of the program will be the presidential address of D. L. Linder on "The Mycologist and His Relation to Others."

The American Society of Naturalists (*Dec. 30, Jan. 1*) will hold a symposium, arranged by Karl Sax, on Wednesday on "Experimental Control of Development and Differentiation," the speakers being G. W. Beadle and E. L. Tatum, A. F. Blakeslee, B. H. Willier and K. V. Thimann. The Biologists' Smoker, admission to which will be limited to persons registered at the meeting, will be held on Monday evening and the Naturalists' Dinner will be held on Wednesday evening, at which J. H. Bodine will deliver his presidential address on "The Cell—Some Aspects of Its Functional Ontogeny."

The Ecological Society of America (*Dec. 27–30*) on Friday afternoon will join the Section on Social and Economic Sciences in a symposium on "Human Ecology," the speakers at which will be F. H. Pike, J. Rus-

sell Smith, Bruce L. Melvin and E. C. Lindeman. On Saturday morning the society will hold a joint session with the Society of American Foresters, on Saturday afternoon a joint session with the Limnological Society of America and on Monday morning a joint session with the Entomological Society of America. An informal banquet will be held on Saturday evening. On Monday afternoon the society will join with the American Society of Zoologists in a symposium on "Population Problems in Protozoa." The annual luncheon of the society will be held on Tuesday noon.

The Genetics Society of America (*Dec. 30–Jan. 1*) will hold two demonstration sessions, one session for invited papers and one for short papers, and will join with the American Society for Horticultural Sciences and the Botanical Society of America in a symposium on "Polyploidy," at which the speakers will be R. E. Clausen, S. L. Emsweller, C. L. Huskins and L. F. Randolph. On Wednesday afternoon the society will join with the American Society of Naturalists in a symposium on "Experimental Control of Development and Differentiation." The annual luncheon of the society will be held on Tuesday noon.

The Limnological Society of America (*Dec. 28–30*) will hold three sessions for the presentation of general papers, and on Saturday afternoon it will hold a joint session with the Ecological Society of America.

The Section on Anthropology (*Dec. 27–30*) will meet jointly with the American Anthropological Association, the American Folklore Society and the Society for American Archeology. Papers are planned on disciplinary studies with special references to integration with cultural and biological disciplines. On the cultural side attention will be focused upon relations with sociology and psychology; on the biological side, upon the relationship of physical anthropology with basic principles of biology, with anatomy, and with medical and dental sciences generally. At the annual dinner on Saturday evening, the retiring president of the American Anthropological Association, J. M. Cooper, and the retiring vice president for the section, N. M. Judd, will both deliver addresses. The section will hold a dinner on Saturday evening, and on Sunday evening it will sponsor an illustrated lecture by Douglas Oliver on "Social Climbing in a Melanesian Plutocracy."

The Section on Psychology (*Dec. 28–30*) will hold a session in two sections on Saturday morning, one session on Saturday afternoon, a session in two sections on both Monday morning and afternoon and a joint banquet with the Section on Education on Monday evening. The session on Saturday afternoon will be devoted to a symposium on "Psychology and the National Emergency," and one of the sections on Monday afternoon will meet in a joint program with the Section on Education.

The Section on Social and Economic Sciences (*Dec. 27*) will join on Friday with the Ecological Society of America in a symposium on "Human Ecology," the participants in which will be F. H. Pike, J. Russell Smith, Bruce L. Melvin and E. C. Lindeman.

The Eastern Division of the American Philosophical Association (*Dec. 26–28*) will hold its meeting from Thursday evening to Saturday afternoon, the Saturday morning program being a joint session with the Section on Mathematics and the Association for Symbolic Logic. The Saturday afternoon program will be a joint session of the American Philosophical Association (including its Eastern Division) and the Section on Social and Economic Sciences of the American Association for the Advancement of Science. Principal papers on this program will be "Science and Value," by Wilbur M. Urban, "Fact and Value in Social Science," by Frank H. Knight and "The Science of Value and the Value of Science," by Ralph Barton Perry. The formal papers will be followed by discussions participated in by Harlow Shapley, Gregory Bateson, Morris R. Cohen and O. H. Taylor.

A plenary session of the society will be devoted to a symposium on "The Nature of Man," participated in by Brand Blanshard, C. I. Lewis and W. H. Sheldon. The subject for consideration at another session will be "The Problem of Religious Knowledge," at which J. S. Bixler, R. L. Calhoun and H. L. Friess will present papers. The president of the Eastern Division of the society, Charles W. Hendel, will deliver his presidential address on a date to appear in the General Program.

The American Association of Scientific Workers (*Dec. 27–28*) will present a symposium on "The Scientist and American Democracy" on Friday afternoon and Saturday morning. The session on Friday afternoon will be introduced by A. J. Carlson in "The Scientist's Concept of a Democratic Society," which will be followed by a discussion of various aspects of "The Scientist and Technology," by A. C. Lane, Charles E. Kellogg and W. Rautenstrauch. At the session on Saturday morning Kirtley F. Mather will read a paper on "The Responsibilities of the Scientist as a Citizen of a Democratic Society," which will be followed by a discussion of various aspects of "The Scientist and Social Problems," by Thomas F. McSweney and Donald E. Montgomery. The session will close with a discussion of "The Preservation of Science," K. A. C. Elliott presenting a paper on "Science in the Belligerent Countries" and L. E. Carmichael a paper on "Science and American Democracy."

Pi Gamma Mu (*Dec. 31*) will hold its usual social science luncheon on Tuesday noon.

The Section on Historical and Philological Sciences is planning to present a symposium on "Scientific Basis for Ethics."

The Section on Engineering (*Dec. 31*) will hold a session on Tuesday morning which will be opened with remarks by Robert L. Sackett, followed by a paper on "Technical Progress in Aviation" by Jerome C. Hunsaker. The remainder of the session will be devoted to discussions of the relations between the Americas, including a paper by Cloyd Heck Marvin on "Cultural Relationships between the Americas" and a paper by Raymond Clapper on "The Press and Inter-American Relations."

At 12:30 the section will have a luncheon at the Engineers Club of Philadelphia at which the speakers will be William Culbertson, former U. S. Ambassador to Chile, and Dr. Carlos Davila, former president of the Republic of Chile.

At the afternoon session Fred Lavis will read a paper on "Engineering Developments in South America"; C. L. Warwick, a paper on "Inter-American Relations in the Field of Engineering Materials"; and P. G. Agnew, a paper on "Exchange of Standards between the Americas."

The Section on Medical Sciences (*Dec. 30–Jan. 1*) will present a symposium on "Malaria" sponsored jointly by the American Society of Tropical Medicine, the American Society of Parasitologists and the National Malaria Committee. The symposium will deal exclusively with human malarias and will be limited in scope to North America, Central America and the West Indies. A total of 39 papers by experts in their separate fields will be presented at six sessions on the mornings and afternoons of Monday, Tuesday and Wednesday. Each author will be limited to 15 minutes for the presentation of his paper, leaving ample time for free discussion. The contributions have been grouped under the headings: "Introduction," "Parasitology," "Anopheline Vectors," "Epidemiology," "The Human Infections: Symptomology," "Pathology," "Therapy" and "Control and Eradication." Abstracts will be prepared and circularized in advance of the meeting, and it is anticipated that the papers will merit publication as a volume in the monograph series of the association.

The Subsection on Dentistry (*Dec. 28*) will present a symposium on "Periodontal Disease." Among those participating will be Balint Orban, E. H. Hutton, J. O. McCall and I. Hirschfeld.

The Subsection on Pharmacy (*Dec. 28*) will hold sessions on Saturday morning and afternoon.

The Research Council on Problems of Alcohol (*Dec. 27–29*) will hold six sessions for the presentation of formal papers in addition to a final session on Sunday evening, at which Thomas Parran, surgeon-general of the U. S. Public Health Service, will deliver an introductory address to be followed by an address by Abraham Myerson, of Harvard Medical School, on "Alcohol—Some Social Considerations."

At the first session, on Friday morning, Wilfred Overholser will deliver an introductory address, which will be followed by eight papers on "Physiological and Chemical Considerations." The participants in this session will be A. C. Ivy, F. A. Hitchcock, H. D. Palmer, H. Newman, Frederick Gibbs and Hallowell Davis, Curt P. Richter, A. Grollman and Thorne Carpenter. At the Friday afternoon session on "Alcoholism—Clinical Aspects," papers will be presented by Philip Piker, H. H. Merritt, W. W. Jetter, Arthur W. Wright, Norman Jolliffe, Timothy Leary and A. J. Carlson.

The general subject for the session on Saturday morning is "Alcoholism—Neuropsychiatric Features." Papers at this session will be read by Foster Kennedy, Leo Alexander, Ross A. McFarland, David Wechsler, Nolan D. C. Lewis, Paul Schilder and E. M. Jellinek. At the Saturday afternoon session the general subject is "Alcoholism—Treatment and Prevention." The participants in this session will be Wilfred Bloomberg, Robert V. Seliger, Karl M. Bowman, Charles E. Parsons, Harry M. Tiebout and Bernard Glueck.

The general subject of the papers to be presented on Sunday morning is "Alcoholism—Social and Legal Problems." At this session papers will be presented by Lawrence Kolb, Edwin R. Keedy, Jerome Hall, Morris Ploscowe, Austin H. MacCormick and an author to be announced. Discussion of the same general subject will be continued in the Sunday afternoon session in papers by Horatio M. Pollock, Donald S. Berry, George S. Stevenson and two others to be announced.

The Section on Agriculture (*Dec. 30*) will join with the Section on Chemistry on Monday in the symposium on "Organic Chemistry in its Applications to Agriculture and Physiology."

The Society of American Foresters (*Dec. 28*) will meet on Saturday morning with the Ecological Society of America.

The American Society for Horticultural Science (*Dec. 30–Jan. 1*) on Monday morning will present its program in four sections—nutrition of fruit trees, nutrition of vegetable crops, ornamental plants and blueberries. On Monday afternoon the program will be a joint session of the Vegetable Crops Section of the society with the Potato Association of America, a general session on physiology of fruit trees, a session on quality and production of vegetable crops and a session on floriculture and ornamental horticulture. The Tuesday morning program will include a joint session of the Ornamental Horticultural Section and the American Phytopathological Society, a general session on fruit trees, a session on breeding vegetable crops, a session on breeding and production of small fruits and a session on storage and processing of horticultural products. On Tuesday afternoon there will be a joint

session with the Physiological Section of the Botanical Society of America and with the American Society of Plant Physiologists on "Ion Availability." Tuesday evening will be devoted to round table discussions on nomenclature and varieties, educational methods, experimental design and blueberries.

On Wednesday morning there will be a joint session on "Polyploidy" with the Genetics Society of America and the Botanical Society of America, and sessions on rootstocks and propagation, nutrition of vegetable crops and nutrition of ornamental plants. Wednesday afternoon will be given over to the business session of the society, at which matters of organization and publication policy and changes in the constitution and by-laws are scheduled for thorough discussion.

The Section on Education (*Dec. 30–31*) will hold a symposium on Monday morning on "Conservation Education." On Monday afternoon it will hold a joint session with the Section on Psychology, at which M. R. Trabue will deliver his address as retiring vice president on "Educational Research and the Defense of Democracy." At the same session E. L. Thorndike will present a paper on "Notes on the Psychology of Migration." On Monday evening the section will join in a dinner with the Section on Psychology.

On Tuesday morning the program will be divided into two sections. The program of one section will consist of papers by Donald D. Durrell, G. M. Ruch, P. J. Rulon, Marion Richardson and D. D. Lorge. The papers in the second section will be by Harry J. Baker, Arthur T. Jersild, Milton B. Jensen, Edward G. Olsen, W. C. Eells, and Marjorie T. Bingham and Edward T. Boardman. The Tuesday afternoon session will consist of papers by M. W. Keller, D. R. Shreve and H. H. Remmers (two papers), S. L. Eby, Paul A. Witty, Harold F. Clark, Harold C. Bingham and Alice L. Brown.

The Society of the Sigma Xi (*Dec. 30*) will hold its annual convention on Monday at 4 P.M. On Monday evening the nineteenth annual lecture under the joint auspices of the association and the society will be delivered by Anton J. Carlson on "Science versus Life."

The American Nature Study Society (*Dec. 26–28*) will begin its meeting on Thursday evening with a program, arranged by Charles E. Mohr, on "Acquainting Philadelphians with Natural Study through Field Trips and Amateur Research Projects." The program on Saturday, arranged by E. Laurence Palmer, will be on "Nature Education's Contribution in an International Emergency." At a Saturday morning breakfast George W. Jeffers will be the guest speaker.

The American Science Teachers Association (*Dec. 30*) will hold two sessions and a luncheon on Monday. At the morning joint session with the American Association of Physics Teachers, Albert E. Marshall will present a paper on "New Types of Glass and New Techniques," Richard M. Sutton, president of the American Association of Physics Teachers, will present the Oersted Medal to an outstanding teacher of physics, and T. F. Joyce will present a discussion and demonstration of television. At the luncheon Albert F. Blakeslee will deliver an address on "Taste and Smell." The program for the afternoon session is a symposium on "The Place of Science in General Education," the speakers on which include Watson Davis, Oscar Riddle and K. Lark-Horowitz.

Gamma Alpha Graduate Scientific Fraternity (*Dec. 28*) will hold a luncheon on Saturday noon.

Sigma Delta Epsilon Graduate Women's Scientific Fraternity (*Dec. 27–Jan. 1*) will hold a luncheon for all women in science on Friday noon.

The National Association of Science Writers (*Dec. 29*) on Sunday morning will present a symposium on "Science Reporting in the World Crisis." After the presidential address by G. B. Lal, retiring president of the organization, there will be a series of brief addresses by such scientists as Albert F. Blakeslee, Edwin Grant Conklin and Walter B. Cannon. Then Waldemar Kaempffert, of the *New York Times,* David Dietz, of the Scripps-Howard Papers, Howard Blakeslee, of the Associated Press, John J. O'Neill, of the *New York Herald-Tribune,* Jane Stafford and Watson Davis, of Science Service, Thomas R. Henry, of the *Washington Star,* and probably other science writers for the daily press will participate in short discussions.

OBITUARY

HARRY BURR FERRIS

HARRY BURR FERRIS, son of Samuel Holmes and Mary Clark Ferris, was born in Greenwich, Connecticut, on May 21, 1865. His death occurred on October 12, 1940, after a brief illness. Educated at the Stamford, Connecticut, High School and Yale University, he received the degree of B.A. in 1887 and his M.D. in 1890.

For more than forty years, as E. K. Hunt professor of anatomy, Dr. Ferris served the Yale School of Medicine, the university and his community with devotion and unceasing effort. Beloved by every one who knew him, his generous sympathy, rare understanding and calm judgment will be missed by all. An extraordinary teacher, he gave of himself without stint in furthering the interests of students and in aiding them to lay a firm foundation for the practice of medicine.

He began his teaching of anatomy immediately after

a year of interneship in the New Haven Hospital. During this first year, he engaged in the practice of medicine, but this he soon gave up to devote his entire time to the work in the school. At this period the fortunes of the school were at low ebb, and for the next fifteen years Dr. Ferris, almost single-handed, taught all the courses in anatomy to the first-year students. He received sporadic help from time to time from practicing physicians, but for long periods he was in the classroom for more than forty hours a week. In spite of this heavy drain on his energy, he was uniformly patient with the adolescent mind, and even sheer stupidity did not ruffle his calm judgment.

His knowledge of anatomy was prodigious and his memory frightening. His lectures are unforgettable. They were delivered quietly, without notes, and were lucid and logical expositions of the facts of anatomy, enriched with frequent references to the problems of clinical medicine. Even the unusually heavy burden of teaching did not quench his interest in fundamental medical science. Precluded from being a prolific producer of scientific articles by his unselfish devotion to the needs of the student, he nevertheless kept alive an eager concern for science. From this interest came occasional papers laboriously and carefully written in such time as he could steal from his teaching duties.

With the advent of Dr. Blumer as dean of the school in 1910, Dr. Ferris's path was made easier with the addition of first one and then two assistants until, at the time of his retirement in 1933, the department had been built up to a personnel of five full-time members. Dr. Ferris was ever unmindful of self and labored constantly to further the interests of his staff. Even though added members made his labors less continuous, yet he always did far more than his share in order that his staff might have time for productive research. He was completely uninterested in fame and fortune, striving always for what he deemed the best interests of the school and its personnel.

Dr. Ferris was one of a group of six great teachers of anatomy in the past generation. With Mall of Johns Hopkins, Piersol of Pennsylvania, Huntington of Columbia, Huber of Michigan, Jackson of Minnesota, stands Ferris of Yale. Profound in their knowledge of anatomy, expert in its exposition and jealous of its traditions, they stood for a concept of anatomy which has practically disappeared from the land. They believed in anatomy as a science, that one could never know too much of it; but they never forgot that anatomy was part of medical science and that the students who went through their hands would eventually be physicians. They believed that anatomy could be reified through examples drawn from the clinic, quite as successfully as from animals used in the experimental laboratory.

With the passing of Dr. Ferris, a chapter is closed; a chapter which can be opened only in memory. To all who knew him, Dr. Ferris will always be remembered as a great anatomist, a great teacher and, greatest of all, a great friend.

H. S. BURR

YALE UNIVERSITY SCHOOL OF MEDICINE

ELVIN L. VERNON

AFTER an illness of three months, Dr. Elvin L. Vernon died on September 27, 1940. He is survived by his wife and son.

He was born in Prescott, Washington, in 1908. After attending the University of Alaska for two years, he returned to this country and completed his undergraduate training at Oregon State College, where he received a bachelor of science degree in chemical engineering in 1928. He went to the University of Washington for some graduate work, then to the University of Wisconsin, where he was in 1932 granted a doctor of philosophy degree in physical chemistry and mathematical physics.

During his years at Wisconsin, he made a theoretical study of solutions of strong electrolytes with H. Falkenhagen, and three papers, on the viscosity and on the dielectric constant of such solutions, were published. For his doctorate thesis, he carried on experimental work with Farrington Daniels on the kinetics of the dissociation of ethyl bromide. The results of this work were later published in the *Journal of the American Chemical Society.*

He was awarded a post-doctorate fellowship to continue his research; after completing this, he turned to the field of teaching. Following his earlier experience as assistant in the chemistry laboratories at Wisconsin, he accepted a position with the People's Junior College in Chicago, where he instructed in chemistry and physics.

Later, at Harvard University, he again took up research, with a study in mathematical physics with A. S. Coolidge and H. S. James. A paper "On the Determination of Molecular Potential Curves from Spectroscopic Data" was published, and Dr. Vernon was before his death extending the methods and computations, there applied to the hydrogen molecule, to other elements.

From Harvard he went to the faculty of the City College of New York, and had completed a year there, teaching chemistry, when he was suddenly taken ill.

His ability had been recognized by several honorary societies; he was a member of Sigma Xi, Phi Lambda Upsilon and Kappa Kappa Psi. He had also joined several professional societies: the American Chemical Society, the American Mathematical Society and the Society of Rheology.

Both in his professional work and in other fields his keen, clear mind made his opinions and studies authoritative. As a teacher, his logical and lucid explanations were excellent; several students have commented to the author on the clarity of Dr. Vernon's presentations. His friends knew him to have complete sincerity and integrity. His keen, dry sense of humor and precision of expression made it an intellectual treat to hear him speak. His thorough training in the three fields of mathematics, physics and chemistry, gave him unusual ability in his varied research work, and enabled him to teach with a breadth of vision.

WORDEN WARING

TULANE UNIVERSITY

RECENT DEATHS

DR. HENRY HURD RUSBY, professor of botany, physiology and materia medica and dean emeritus of the New York College of Pharmacy, Columbia University, died on November 18 at the age of eighty-five years.

FRED E. GLADWIN, chief in research in pomology of the New York State Agricultural Experiment Station, died on November 16. Mr. Gladwin had been in charge of the station's Vineyard Laboratory at Fredonia, N. Y., since 1909.

DR. JOHN P. TURNER, assistant professor of zoology at the University of Minnesota, died on November 11 at the age of thirty-eight years.

PROFESSOR J. FRANKLIN COLLINS, taxonomist and forest pathologist, died on November 15, after a long illness. A correspondent writes: "He would have been seventy-seven years old in the last of December. Professor Collins was assistant professor of botany, curator of the Olney Herbarium and chairman of the department at Brown University until 1911, and from then until his retirement in 1934, he was successively forest pathologist, pathologist and senior pathologist, in charge of the Office of Forest Pathology, of the Bureau of Plant Industry, located at Brown University, which dealt with the diseases of trees and ornamental shrubs. During the latter period he was also lecturer and curator of the herbarium at Brown University."

SIR FREDERIC STUPART, formerly director of the Meteorological Service of Canada, died on September 27 in his eighty-fourth year. A correspondent writes: "Sir Frederic entered the Meteorological Service of Canada just after it was organized, in December, 1872, became director in December, 1894, and retired in July, 1929. He was knighted in June, 1916. He was a past president of the American Meteorological Society, an honorary life member of the Royal Meteorological Society of England and a fellow of the Royal Society of Canada. He issued the first weather forecasts from the Canadian Service and had much to do with the development of the Meteorological Service since its inception until the time of his retirement. He was prominent at the international meteorological meetings held during his term as director, and published many articles, especially on the climatology of Canada."

ERNEST WILLIAM MACBRIDE, since 1919 until his retirement in 1934 professor emeritus of zoology of the Imperial College of Science, South Kensington, of the University of London, Strathcona professor of zoology at McGill University from 1897 to 1909, died on November 19. He was seventy-three years old.

SCIENTIFIC EVENTS

THE PLANT, SOIL AND NUTRITION LABORATORY BUILDING OF THE FEDERAL GOVERNMENT AT CORNELL UNIVERSITY

THE United States Plant, Soil and Nutrition Laboratory Building which the Federal Government has erected at Ithaca, according to the *Cornell Alumni News,* opened this autumn under the direction of Dr. Leonard A. Maynard, professor of animal nutrition at the university. Some of its staff hold joint appointments with the U. S. Department of Agriculture and the university; others are members of the university whose research is being coordinated with that of the laboratory.

Dean Carl E. Ladd, of the College of Agriculture, explains that the laboratory "will attempt to coordinate all present knowledge of vitamins, the effect of minor mineral elements on plants, and the results of lack of essential elements on the health and growth of animals and people. It will, in general, enlarge present knowledge of plant and animal nutrition and project present knowledge into new fields."

Coincidently with its opening, the university announced appointment of Dr. Karl C. Hamner as assistant professor of plant physiology in the department of botany, to be in charge of plant investigations in the laboratory, and of Dr. Gordon H. Ellis as biochemist in the laboratory and assistant professor of biochemistry and nutrition.

Professor Hamner has been for three years a member of the department of botany at the University of Chicago, part of his research dealing with relations of hormones and vitamins to plant growth.

Professor Ellis has been an instructor in animal nutrition, working with Professor Maynard and Professor Clive M. McCay on the relation of diet to age

changes, with special reference to the chemistry and physiology of lactation.

Two of three projected wings of the new laboratory building, costing $100,000 each, are now completed. The building was designed by the University Department of Buildings and Grounds with Carl C. Tallman as consulting architect, and was constructed by the Federal Government on a site leased from the university.

FELLOWSHIPS OF THE E. I. DU PONT DE NEMOURS AND COMPANY

E. I. DU PONT DE NEMOURS AND COMPANY has awarded six postdoctorate fellowships for research in organic chemistry and twenty postgraduate fellowships for research in the field of chemistry for the academic year 1941–42. Twenty institutions will benefit. The postdoctorate fellowships are for $2,000 each, and the postgraduate fellowships are for $750 each.

The postdoctorate fellowships will be placed under the direction of R. T. Arnold, instructor, University of Minnesota; Paul Bartlett, assistant professor, Harvard University; Ralph Connor, assistant professor, University of Pennsylvania; R. C. Elderfield, assistant professor, Columbia University; C. B. Purves, assistant professor, Massachusetts Institute of Technology, and H. R. Snyder, instructor, University of Illinois. These men will succeed an equal number of faculty members who have held the grant in the past few years. This is in accord with the policy of rotating the grants so that especially meritorious younger instructors and professors may participate in the plan.

Appointments to the postgraduate fellowships will be made later in the academic year by the heads of the chemistry departments of the respective universities. The twenty institutions to which awards have been granted are:

The University of California, University of Chicago, Columbia University, Cornell University, Harvard University, University of Illinois, the Johns Hopkins University, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, Northwestern University, Ohio State University, Pennsylvania State College, University of Pennsylvania, Princeton University, Purdue University, Stanford University, University of Virginia, University of Wisconsin and Yale University.

Fellowships for advanced work in chemistry were established by the du Pont Company in 1918, when there was a dearth of men adequately trained for chemical research. Through the fellowship plan, the company sought to prepare promising young men for a career in this phase of science. These grants, which with one interruption have been maintained since 1918, differ from the average industrial fellowship in that the selection of the beneficiary and the subject of research are left to the discretion of the university. There is no actual or implied obligation as to future employment of the fellowship holder. The success of this plan is evinced by the fact that its beneficiaries have been widely employed.

Through the postdoctorate phase of the plan, the company provides funds with which gifted younger instructors and professors may carry on broad and difficult researches by employing highly qualified assistants. This assistance is intended not only to increase contributions to science, but also to perfect the technique of these men in teaching chemical research, thus enhancing their interest in remaining in the academic field. The company is mindful of its debt to university chemical faculties and desires its postdoctorate program to open larger avenues of service to promising younger teachers.

THE PAN AMERICAN CONGRESS OF OPHTHALMOLOGY

THE Pan American Congress of Ophthalmology was organized on a permanent basis at the meeting of the first congress, which was held in Cleveland, on October 11 and 12, under the auspices of the American Academy of Ophthalmology and Otolaryngology.

Dr. Harry S. Gradle, Chicago, was elected president of the congress. Drs. Conrad Berens, New York, and Moacyr E. Alvaro, São Paulo, Brazil, who served with Dr. Gradle as members of the committee that organized the initial meeting, were elected executive secretaries.

The following vice-presidents were elected: Drs. S. Hanford McKee, Montreal; Frank E. Brawley, Chicago; Edward Jackson, Denver; Tomas R. Yanes, Havana; A. Vasquez-Barriere, Montevideo, Uruguay; Jose Pereira Gomes, São Paulo, and Enrique Demaria, Buenos Aires.

There will also be a council, which is to be formed by one representative from each of the twenty-one American republics. The representative from each country is to be elected by the national ophthalmological society or societies, if such exist; if there is no such society, the government of the country will be asked to appoint a member of the council.

Montevideo was tentatively selected as the place of the next meeting, to be held in 1943.

Eighteen delegates representing governments, universities, hospitals and medical societies in Brazil, Chile, Costa Rica, Cuba, Colombia, Guatemala, Panama and Puerto Rico were present in Cleveland. An extensive program of scientific papers was presented, about equally divided between English, on the one hand, and Spanish and Portuguese on the other. English papers were discussed by Latin American speakers; those in Spanish or Portuguese by the English-speaking physicians.

The language difficulty was overcome successfully by the use of slides. Extensive summaries of the papers

were projected on the slides in Spanish or Portuguese for the English ones, or in English for those given in the other languages.

Earlier in the week the Latin American delegates were guests of the academy at its scientific sessions and at the annual banquet, where each was formally introduced. At the Pan American banquet held on October 11, the guests from Latin America expressed appreciation and enjoyment of the meeting. It was the general impression that the congress had brought about better understanding among the ophthalmologists of the Western Hemisphere. The Latin Americans were impressed by the meetings of ophthalmologists in this country and those of the United States were in turn impressed by the scientific ability and skill of the Latin Americans.

At the conclusion of the meeting the Latin Americans left to attend special clinics that were being held in their honor at some of the large ophthalmological centers of the East and Middle West.

THE NEW YORK MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

THE annual meeting of the American Society of Mechanical Engineers will open at the Hotel Astor, New York, on December 2, instead of at the Engineering Societies Building, the headquarters of the society, where previous meetings have been held. The sessions continue to December 6.

Registration, technical sessions and many social events, including luncheons and dinners, will be at the Hotel Astor, except as specifically noted in the official program.

There are 105 papers announced on the technical program to be read at forty-four sessions. Among the subjects to be treated are: Machine Line Production of Aircraft Materials, Elasticity and Vibration, Fuels, Machine Shop Practice, Work Standardization, Boiler Feedwater Studies, Applied Mechanics, Metals Engineering, Industrial Instruments, Mathematical Statistics, Dust Collection, Power, Petroleum, Handling, Operations in Industrial Plants, Lubrication, Mechanical Springs, Rolling and Plasticity, Port and Terminal Handling, Industrial Marketing, Textile, Ammunition, Management, Safety, Fluid Meters, Training to Meet the National Emergency, Heat Transfer, Hydraulics, Rubber and Plastics, Dynamics of Vehicles, Railroad, Temperature and the Properties of Metals. There will be a symposium on Power in Ships on Thursday evening.

A memorial tablet to Dr. Calvin Winsor Rice, who was secretary of the society from 1906 until his death in 1934, will be unveiled on Monday at noon.

In conformity with usual practice, Wednesday evening will be set aside for the annual banquet at the Hotel Astor, at which Warren H. McBryde, president of the society, will make the principal address and other speakers of national reputation will be heard. Honorary memberships, medals and awards and fifty-year badges will be presented at the annual dinner. A number of other dinners and luncheons will be given during the course of the meeting.

There will be shown at the Astor the annual photographic exhibit of members of the society and other participants. In addition to photographs, there will be a display of photostats of automobiles of the eighteen-thirties, from the collection of Sidney Withington, electrical engineer of New Haven. A wide variety of illustrations, including many cartoons, relating to early self-propelled road vehicles of a century ago will be exhibited.

As usual inspection trips will be made to local plants of interest to mechanical engineers, including a visit to the largest passenger vessel built in a shipyard in the United States, the *S.S. America*. The new airport at North Beach and La Guardia Field will also be visited, as will the new Sixth Avenue Subway, the East-River-Midtown tunnel and the 35-mile belt parkway. Trips to industrial and power plants covering a wide range of special interests are also being provided.

SCIENTIFIC NOTES AND NEWS

THE Hughes Medal of the Royal Society, London, has been awarded to Dr. Arthur H. Compton, Charles H. Swift distinguished service professor of physics at the University of Chicago.

THE George White Medal of the Massachusetts Horticultural Society has been awarded to Sir Arthur William Hill, since 1922 director of the Royal Botanical Gardens at Kew, England. The Jackson Dawson Memorial Medal has been awarded to G. G. Nearing, of Ridgewood, N. J., for his work with rhododendrons. Gold medals have been awarded to A. T. De La Mare, New York publisher of *The Florists' Exchange*, and Arthur Herrington, manager of the New York Flower Show.

DR. CARL P. HUBER, associate professor of obstetrics at the School of Medicine at Indianapolis of Indiana University, has received the 1940 award of the Central Association of Obstetricians and Gynecologists for the best clinical essay. The title of the paper, which was prepared with the assistance of Dr. Jack C. Shrader, 1940 graduate of the Medical School and now an intern in the Indianapolis City Hospital, was "Blood Pro-

thrombin Levels in the Newborn." Dr. Shrader received the Ravdin Gold Medal awarded to the student with the highest rank at the June commencement.

THE council of the British Institution of Mechanical Engineers has awarded the James Watt International Medal to Professor Aurel Stodola, of Zurich, on the recommendation of the Engineering Institute of Canada, the Czechoslovak Society of Engineers and the Swiss Society of Engineers and Architects. The medal, which was founded in 1936 to commemorate the bicentenary of the birth of James Watt on January 19, 1736, is awarded every two years to an engineer of any nationality who is deemed "worthy of the highest award that the institution can bestow and that a mechanical engineer can receive." In making the award the institution has secured the cooperation of engineering institutions and societies in all parts of the world.

THE Crompton Medal of the British Institution of Automobile Engineers has been awarded to Dr. J. S. Clarke, of Birmingham Corporation Gas Department, for a paper entitled "The Use of Gas as a Fuel for Motor-vehicles."

A DINNER in honor of Dr. Harry Stoll Mustard, the new director of the De Lamar Institute of Public Health of the College of Physicians and Surgeons of Columbia University, was given on November 19 by the Alumni Association at the Hotel George Washington. Dr. Leonard J. Piccoli, president of the association, presided. Speakers at the dinner were Dr. Wilson G. Smillie, professor of public health and preventive medicine at the Cornell University College of Medicine; Dr. Harry Stoll Mustard and Commander C. S. Stephenson, an alumnus in charge of the Division of Preventive Medicine, Bureau of Medicine and Surgery of the United States Navy.

PROFESSOR FREDERICK G. SWITZER, who has resigned as head of the department of mechanics in the Sibley College of Engineering at Cornell University to become a division engineer with the New York City Board of Water Supply, was honored by members of the faculty at a dinner on November 5 at Willard Straight Hall. Director William N. Barnard, of Sibley College, spoke of Professor Switzer's twenty-four years of service at the university, and Dean S. C. Hollister expressed the loss of the college at Professor Switzer's departure.

W. C. BROWNING, general manager of the Golden Queen Mining Company, Los Angeles, has been elected chairman of the western division of the American Mining Congress. He will serve for one year and will take charge of plans for the eighth annual metal mining convention and exposition of the division, which will be in San Francisco from September 29 to October 2.

DR. J. C. MILLER, assistant professor of animal industry at the Louisiana State University, has resigned to become professor of animal husbandry in charge of sheep work at the Texas Agricultural and Mechanical College.

ROBERT M. SALTER, associate director and chief in agronomy of the Ohio Experiment Station and chairman of the department of agronomy at the Ohio State University, became director of the Experiment Station of North Carolina College on October 1. Dr. L. D. Baver, associate in agronomy of the Ohio Station and professor of agronomy at the Ohio State University, has been appointed associate director.

EUGENE SCHOFIELD HEATH, of Atlanta, has been made director of the new Georgia Botanical Garden which is in process of development on a four hundred and fifty-nine acre tract about eight and a half miles west of the business center of Atlanta. At present he is engaged mainly in the making of a species survey of the area.

Museum News states that Francis A. Young, who was acting director of the New England Museum of Natural History, Boston, during the absence last summer of Director Bradford Washburn, has been appointed assistant director.

DR. SIDMAN P. POOLE, associate professor of geology and geography at Syracuse University, major in the Army Reserve, has been called for duty in the Army Intelligence Division. He will be engaged in geographic work.

N. W. PIRIE, Rockefeller demonstrator in the School of Biochemistry of the University of Cambridge, has been appointed head of the Biochemical Section of the Rothamsted Experimental Station.

THE Lord President has appointed Dr. A. V. Hill, Foulerton research professor of the Royal Society; Sir Felix Pole, chairman of Associated Electrical Industries, and Sir Robert Robinson, Waynflete professor of chemistry at the University of Oxford, to be members of the Advisory Council of the Committee of the Privy Council for Scientific and Industrial Research. They succeed Dr. W. H. Mills, Professor A. Robertson, Sir Albert Seward and Sir Harry Shackleton, who have retired from the council on completion of their terms of office.

DR. HILDRUS A. POINDEXTER has recently returned to Washington after spending six months in South America and the Caribbean. Two months were devoted to visiting bacteriological and researeh laboratories in Brazil, Uruguay, Argentina, Chile, Peru, Ecuador, Republic of Panama and Caribbean republics. The other four months were spent in the study of protozoology at the School of Tropical Medicine at San Juan, Puerto Rico.

DR. KIRTLEY F. MATHER, professor of geology at Harvard University, was the guest of the department of geology and geography of the Michigan State College on November 19. In the afternoon he gave a lecture entitled "Plumbing the Depths of the Earth."

DR. HAROLD W. MANTER, professor of zoology at the University of Nebraska, gave the Sigma Xi lecture at the Iowa State College on November 4. He spoke on "The Galapagos Islands, with Special Reference to Their Biological Significance."

A LECTURE entitled "The Use of Isotopes in the Study of Metabolism" was given on November 19 by Dr. Rudolf Schoenheimer, associate professor of biological chemistry of the College of Physicians and Surgeons of Columbia University, before the Kappa Chapter of Sigma Xi of the university.

DR. CYRIL N. H. LONG, Sterling professor of physiological chemistry at the School of Medicine of Yale University, delivered the fifth Renziehausen Memorial Lecture at the meeting of the Allegheny County Medical Society on November 19. His subject was "The Endocrine Control of Metabolism."

BRADFORD WASHBURN, executive director of the New England Museum of Natural History, will lecture at the museum on January 8 on "The Conquest of Mount Bertha." He will describe the Glacier Bay Expedition, during which he and his party camped for nearly a month among the mountains west of the bay, making the first exploration of the eastern ramparts of the Fairweather Range.

PROFESSOR DOUGLAS JOHNSON, of Columbia University, on November 12 addressed the Science Association at Wesleyan University on "The Mysterious Craters of the Carolina Coast." Later the same evening he was a guest of the Honors College, where he talked informally on our current international problems. On November 15 he spoke before the Research Laboratory Colloquium of the General Electric Company at Schenectady on research in the natural sciences, with illustrations from studies of the Carolina "bays."

DR. R. RUGGLES GATES, professor of botany in the University of London, lectured recently at the University of Colorado, the University of Denver and the University of Utah on "The Significance of the Blood Groups." He also gave lectures and addresses at the University of Denver on "The Amazon," on "India," on "Recent Progress in the Study of Evolution" and on "The Nature of Racial Differences in Man." He plans to lecture at the University of California in the departments of botany, zoology and anthropology, and in the Medical School and the School of Agriculture.

THE annual dinner and meeting of the New York Academy of Sciences will be held on the evening of December 11. It is requested that those planning to attend assemble at the Broadway Theater, Fifty-third Street and Broadway, at six-thirty o'clock, where a preliminary showing of "The Origin of the World and the Evolution of the Dinosaurs" from the "Rite of Spring," a fantasia by Walt Disney, will be presented by courtesy of the Walt Disney Productions. "The Methods of Walt Disney Productions" will be demonstrated by Barnum Brown, of the American Museum of Natural History, immediately after the annual dinner. An address entitled "Biological Bases of Democracy" will be made by Dr. Edwin Grant Conklin, professor of biology emeritus of Princeton University and executive vice-president of the American Philosophical Society. Following Dr. Conklin's address, Dr. Harold E. Vokes, who returned recently from the French mandates of Syria and Lebanon, will describe his experiences there. His address will be entitled "Around the War to Syria and Lebanon." It will be illustrated by color motion pictures and lantern slides, which will be shown for the first time at the dinner.

THE seventh annual meeting of the American Academy of Tropical Medicine was held on November 14, in conjunction with the American Society of Tropical Medicine, meeting with the Southern Medical Association in Louisville, Ky. The presidential address, entitled "Some Contributions of United States Naval Medical Officers to Science," was delivered by Dr. Charles S. Butler, Rear Admiral, Medical Corps, U. S. Navy, Retired. The following officers were elected for the year 1941: *President,* Dr. Marshall A. Barber; *Vice-president,* Dr. Herbert C. Clark; *Secretary,* Dr. Ernest Carroll Faust; *Treasurer,* Dr. Thomas T. Mackie; *Councilor* (5-year term), Dr. L. L. Williams; *Councilor* (3-year term), Dr. Harold W. Smith.

ACCORDING to *Museum News,* the Michigan-Indiana-Ohio Museum Association has been reorganized and the name has been changed to the Midwest Museums Conference of the American Association of Museums. The Wisconsin Museum Association is taking action to join, and museums in Illinois, Missouri, Minnesota and Rochester, N. Y., are also affiliated with the conference. Dr. Carl E. Guthe, director of the University Museums of the University of Michigan, has been elected president.

THE Rockefeller Foundation has made a grant of $17,000 to support the researches of Dr. Peter J. W. Debye, professor of chemistry at Cornell University.

THE Charles W. Hargitt research fellowship in zoology at Duke University becomes available for the year 1941–1942. The fellowship, which carries a

stipend of $1,000, is restricted to research work in the field of cytology. It is open to those who have already received their doceor's degree and have worked in this field. Appointment is for a single year with the possibility of reappointment; no teaching or assistance is required of the holder of the fellowship. Applications must be made before March 1, accompanied by statements of investigations, publications or work in progress. Inquiries and applications should be sent to Dr. Geo. T. Hargitt, Biology Building, Duke University, Durham, N. C.

THE geological courses at Upsala College, East Orange, N. J., have been discontinued. Its geological collections have been divided among the U. S. Military Academy, the Smithsonian Institution and the Massachusetts Institute of Technology.

Museum News states that in acordance with a measure passed by the City Council in August the Cleveland Museum of Natural History took over control of the Brookside Park Zoological Garden in Cleveland at the beginning of October. Harold T. Clark, president of the museum, invited thirty citizens of Cleveland to serve on a board of control for the zoo. The museum now has control of the Holden Arboretum, the trailside museums in the parks and the Zoological Garden. The contract with the city provides that the mayor, director of public properties and president of the City Council be members of the board of trustees. The city provides $50,000 annually for the operation of the park by the museum, provides repairs and policing and furnishes public utility service without cost. The museum is given full authority to manage and develop the garden.

GLENCOE, a seven-acre estate at Irvington, N. Y., valued at $50,000, and originally a part of the Alexander Hamilton family holding, has been given to Columbia University by Mr. and Mrs. John W. Donaldson, of Millbrook, N. Y. It will become part of the arboretum being developed for use by students in landscape architecture at Columbia. Glencoe borders Nevis, the sixty-eight acre estate presented to the university in 1935 by the late Mrs. T. Coleman du Pont, of Wilmington, Del., widow of the former United States Senator from Delaware and mother of Mrs. Donaldson. The grounds of Glencoe will be adapted to the general scheme of the Nevis Arboretum.

THE Board of the Nobel Foundation at Stockholm, on October 11, asked the Swedish Government to allow a postponement in conferring the 1940 Nobel Prizes for literature, physics and chemistry until the 1941 prizes are conferred. The prize in physiology and medicine has also been reserved until 1941 by the Faculty of the Carolean Medico-Surgical Institute in Stockholm. The Peace Prize, which the Nobel Committee of the Norwegian Storting has to confer, also can not, for obvious reasons, be conferred this year.

DISCUSSION

PROBLEMS OF AGING

THE NATIONAL INSTITUTE OF HEALTH of the United States Public Health Service is organizing a new unit for research into some of the many problems of aging. With the conspicuous shift to greater age in the population, senescent individuals are becoming increasingly significant in the national economy and defense. Preventive medicine must attack the practical problems of the rising proportion of deaths attributable to diseases of middle and later life and energetically attempt to augment the health and vigor of those past the meridian. Aging is a continuous biologic phenomenon which starts upon creation of a new individual and continues at variable rates until death. The problems of aging (gerontology) are not limited to the diseases of the aged (geriatrics), for the latter are the consequences of senescence. In man, probably the most significant period of life for gerontologic study is late maturity, approximately the two decades between 40 and 60.

The problems of aging are logically divisible into three major fields of investigation: (1) the biology of senescence as a process, (2) the human clinical problems of aging and of diseases characteristically associated with advancing years which include the mental changes of senescence and senectitude as well as the physical changes, and (3) the socio-economic problems of a shifting age distribution in the population. The National Institute of Health is concerned with the first two of these divisions of the science.

In order to advise this new unit, there has been formed a National Advisory Committee on Gerontology, representative of the scientific thought of the nation. The membership of this advisory committee includes: L. R. Thompson, director, National Institute of Health, U. S. Public Health Service; Anton J. Carlson, physiologist, University of Chicago, National Research Council; Charles L. Christiernin, Association of Life Insurance Medical Directors of America; medical director, Metropolitan Life Insurance Co.; Robert A. Coker, zoologist, University of North Carolina; William Crocker, botanist, Boyce Thompson Institute for Plant Research; Lawrence K. Frank, sociologist, Josiah Macy, Jr. Foundation; A. Baird Hastings, biochemist, Harvard University; Ludvig Hektoen, pathologist; consultant, National Cancer Institute, U. S. Public Health Service; Winfred Overholser, psychiatrist, superintendent, St. Elizabeths

Hospital; Clarence Selby, industrial physician, General Motors Corporation; William D. Stroud, clinician, Philadelphia, Pa.

The first service to scientific research which the unit on gerontology is undertaking is to conduct a survey of the present trends of active and contemplated investigations into the problems of aging in American scientific institutions. This survey is intended to ascertain just what problems are being studied and what methods of approach are being applied. There is no desire to learn, in advance of publication, the data being developed in these specific undertakings.

In addition to these studies, many investigations which do not pertain directly to aging should yield data useful to workers in gerontology. The unit on gerontology is especially interested in knowing of these indirectly related studies, the full implications of which are far too often obscured in their published titles.

Inquiries about studies related to aging are being sent to scientists in the basic biologic sciences as well as to clinical investigators, for much fundamental work upon the processes, mechanisms and consequences of senescence is probably going on in the sciences of botany, zoology, physiology, pharmacology, psychology, etc. From the clinical viewpoint, our greatest concern is with those studies dealing with health evaluation, mensuration of functional capacity (including criteria of "physiologic age") and with those diseases whose incidence increases sharply in later life (the so-called "degenerative disorders").

Critical analysis of the information elicited by such a survey may be expected to serve several valuable purposes. It should assist in bringing together in closer cooperation investigators interested in related problems, especially when widely divergent methods of approach are being utilized. The survey will likewise emphasize the urgent need for greatly augmented support for significant studies of these vitally important problems of senescence.

The broad and general pattern of the problems being investigated will undoubtedly reveal a number of neglected "blank spots" which may justify special emphasis in the future. Analysis of the data of the survey will also be an invaluable aid in formulating future research programs, both at the National Institute of Health and elsewhere.

From preliminary inquiries it is observed that there is a great but largely latent and scattered interest in the problems of aging. It is the hope of the unit of gerontology of the National Institute of Health that the present survey may serve to effectively aid the promotion of closer cooperation of the scientists interested in these fields.

Information concerning subjects under investigation and the methods of approach is earnestly solicited.

DR. EDWARD J. STIEGLITZ
U. S. PUBLIC HEALTH SERVICE,
BETHESDA, MD.

SHALL ZOOLOGY REVERT TO THE TIME OF LINNAEUS?

WHEN I read "A Short Zoology of Tahiti in the Society Islands," by Anthony Curtiss,[1] it was clear to me that others would feel as I did when I placed it back on my library shelf.

This little book contains six chapters, namely, mammals, birds, reptiles, fishes, insects and worms and in its classification of these reverts to the time of Linnaeus about 1758.

The attitude and cultural approach to the zoology of Tahiti may be gained from the first two paragraphs of the Introduction:

> Zoology is the study of animal life, as distinguished from botany (the study of plants) and mineralogy (the study of minerals). It is a branch of learning that has interested many of the so-called scientists, because by means of a distortion of it they hope to prove many theories of theirs. As all persons who are virtuous and honest must desire to disprove the distorted and mistaken notions taught by the professors and blindly and superstitiously received by their pupils, it is well that some people should study zoology and report their findings. This little book is only a small beginning; in my greater zoology I shall disprove more of their fables. . . . Too great a use of little understood words, and the employ of too involved a system of classification, are the marks of collegiate duncery. But we need some system, for the sake of convenience, and some technical words, for things having no ordinary names.
>
> As for the system, I use a modified form of the system of Linnaeus, who gave us the binomial (two-term) system that most "scientists" pretend to follow, though they have befogged it with many unconvincing modifications of their own. For instance, they will tell you that spiders and crabs are not insects. Linnaeus, the first to use the word *insecta* in a scientific sense, used it to include all animals having jointed legs. Even the "scientists" admit that spiders, crabs, etc., belong to one group, to which insects (as they restrict the term) also belong; they call this group *arthropods*. But why not use the old Linnaean word *insects*, that everybody understands? I suppose that they do not use it, because they imagine it sounds better to use fancy Greek words that few people know.

Chapter V, on insects, is somewhat more inclusive than the heading suggests as judged from the following quotation, p. 140:

> Following the system of Linnaeus, which is easier to understand than the wild nonsense of the "scientists," I shall include under the term *insects* all those animals

[1] Brooklyn, N. Y.: Guide Printing Company, pp. xvi + 193, 1938.

(moving forms of life) that have no backbone, yet, in their adult stage at least, have jointed legs; while I shall consider as lower forms of life, or *worms*, as Linnaeus calls them (Vermes), those that have neither backbones nor (in their adult stage) jointed legs.

On pages xv and xvi he states:

The system I follow is that of Linnaeus, a little modified, as in the fourth edition of my little New England zoology; but this is the first time I have brought Linnean, that is, binomial technical names, into the text of my work. If I use the word *family*, as I may from time to time, I always mean the *genus*, in the binomial sense, as used in Linnaeus. With that other invention, the non-Linnean family, with its everlasting *-idae*, and her sister *-inae*, I have nothing to do. This *-idae* and *-inae* are tag ends that the "scientists" hang onto genera to make up super-genera such as good old Linnaeus never heard of.

This book will cause zoologists much concern because many new binomial names are published with descriptions. Among the fishes (listed on pp. 32–139) only six previous Linnean names were used, and 120 new binomial names are introduced. Many new names are given for the other animals described, probably all of which will be included with the list of synonyms for well-known species of Tahiti. This has been done by Henry W. Fowler for the fishes in a forthcoming publication of his. Curtiss, apparently unacquainted with the extensive zoological literature on South Pacific animals, gave new names to those living around Tahiti because suitable ones were not printed in 1758, and later works are unknown to him.

LEONARD P. SCHULTZ

PALEONTOLOGICAL DISCOVERY IN SIBERIA

A FEW days ago the undersigned received from the U.S.S.R. Society for Cultural Relations with Foreign Countries, in Moscow, the following translation of a recent report on a rare paleontological find in Siberia, which may be of wider interest. It reads as follows:

NOVOSIBIRSK, SEPTEMBER 19

Members of the Komsomol Young Communist League of the "Iskra" Collective Farm discovered the complete skeleton of an ancient fossil animal in a layer of black silt at a depth of six meters. This discovery was made on the bank of the small river Oyesh, near the village of Vakhrushevo, eighty kilometers from Novosibirsk. The skeleton has been handed over to the Novosibirsk Museum, where it has been restored. Scientists have now established the fact that this is a skeleton of a representative of a large species of fossil elephant (*elephas antiquus*) which, in the early glacial epoch, was of wide occurrence. This elephant is one of the predecessors of the mammoth and differs from it by a lesser curvature of the tusks.

In spite of the young age of this elephant, as is evidenced by the jaws and the non-ossified cartilage parts of the body, the height of the skeleton is 270 cm, its length, to the base of the tusks, is 325 cm, the length of the tusk is 150 cm. The skull is smaller than that of a mammoth. The upper and lower jaws of the unearthed specimen have four teeth each.

Scientific workers have left Novosibirsk to study the layer of soil where the elephant was imbedded. . . .

In an interview with a *Tass* correspondent, Academician A. A. Borisyak, director of the Paleontological Institute of the Academy of Sciences of the U. S. S. R., stated the following:

"The skeleton unearthed near Novosibirsk is of outstanding scientific value. This is the first discovery in the Soviet Union of an entire fossil elephant referring to the beginning of the Quaternary period. Hitherto we could judge of such elephants only by separate teeth which were found."

Upon learning of this valuable discovery the Paleontological Institute communicated with the Novosibirsk Museum and intends to send there a scientific collaborator in order to study this specimen of *elephas antiquus* on the spot.

A. HRDLIČKA

U. S. NATIONAL MUSEUM

SCIENTIFIC BOOKS

FLORA OF INDIANA

Flora of Indiana. By CHARLES C. DEAM. 1236 pp. 2247 maps. Indianapolis: Department of Conservation, Division of Forestry. 1940. $3.50.

THIS impressive volume represents the work of many years, as the distribution maps of individual species of flowering plants and ferns attest. It will undoubtedly serve as the model for state floras of the future, and the numbering of genera according to the system of Dalla Torre and Harms provides for interpolation of genera as one wishes. Conversely, the "Flora of Indiana" provides a background for arranging genera in the herbarium in a systematic rather than an alphabetic way. Indiana includes a large proportion of the species of eastern United States, and the comprehensive text references make it a sort of dictionary for the latest recognized names and their place of publication. Nothing, it seems, has been forgotten in making the work complete. There are keys to families and genera, summaries of the herbaria examined, statistical accounts of collectors in Indiana, glossaries, a register of obsolete locality names, and so on. The thirty-six pages of introduction to the

main catalogue of plants include an account of seven recognized plant areas of Indiana: the Dune Area along the shores of Lake Michigan; the Lake Area in the north, characterized by many plants of the coastal plain; the Tipton Till Plain, composed of flat lands extending south to the limit of Wisconsin drift, in which native plants have been almost exterminated by agriculture; the Illinoian Drift, south of the Tipton Till, including ravines, oak flats and sandy terraces; the Prairie Area, now chiefly in the northwest; the Lower Wabash Valley, often inundated, and the northeastern limit of many species of the Mississippi Valley; the Unglaciated Area, with chestnut oak and accompanying species which have penetrated across the Ohio River. Statistics show 1,838 native and 302 introduced species, with many additional varieties and forms. Notations on the period of flowering, comparative morphology under varying habitat, behavior of species under cultivation and rate of increase of introduced plants provide much of interest to the amateur. Thus of *Ampelamus albidus* (p. 769) we read: "The beekeepers widely publicized this plant as an excellent honey plant under the name of bluevine. We introduced it for this purpose at Bluffton and some seed escaped and we have been trying to exterminate it now for eight years without success."

One of the most interesting passages in the book will be found on pages 1125 to 1129, where detailed explanation is given of habitat terms such as "slough," "bog," "pond" and "prairie."

The eighty-seven pages of excluded species (more than 700 items) represent previous incorrect determinations, unsubstantiated records, etc., and reveal the pitfalls which beset the careful worker. The "Flora of Indiana" upholds Dr. Coulter's statement in the preface: "It is safe to say that in no other regional Flora has such meticulous care been taken to secure absolute accuracy in determination, as well as the very latest word in these special studies."

HENRY K. SVENSON

BROOKLYN BOTANIC GARDEN

LAND MOLLUSCA OF NORTH AMERICA

Land Mollusca of North America (North of Mexico). Vol. 1, Part 2. By HENRY A. PILSBRY.[1]

IT was my pleasure to review in SCIENCE (Vol. 91, No. 2360, pp. 292–293) Vol. 1, Part 1, of this important publication. I refer the reader of the present note to that review, in which the scope, significance, as well as the timeliness of this endeavor are discussed.

In Part 2, which covers the families Polygyridae and Sagdidae, the author has employed the same thoroughgoing methods that he employed in Part 1.

Students of North American land mollusks will here find keys to assist in quickly locating their species in the proper superspecific categories adopted in the present system, as well as adequate text and illustrations for the determining of the species and subspecies themselves.

Table I is in continuation of the one published for Part 1 and briefly calls attention to the strides that have been made since Binney published his Memorial volume in 1885, and also the significant part that Dr. Pilsbry has played in bringing our knowledge of the subject to its present status.

TABLE I

	Species older than 1885	Species here accepted	Subspecies here accepted	Pilsbry's species	Pilsbry's subspecies
Family V. POLYGYRIDAE					
subfamily Polygirinae					
Genus Polygyra					
Subgenus Polygyra	2	2	5		
Subgenus Daedalochila	18	21	20	2	10
Genus Stenotrema	10	24	13	9	3
Genus Praticolella	5	7	7		1
Genus Mesodon					
Subgenus Mesodon	12	19	18	3	9
Subgenus Patera	2	6			3
Subgenus Appalachina	1	2		1	
Subgenus Inflectarius	2	4	4	1	
Genus Trilobopsis	1	5	6	2	3
subfamily Triodopsinae					
Genus Triodopsis					
Subgenus Triodopsis	4	11	19	2	9
Subgenus Xolotrema	3	4	5		1
Subgenus Neohelix	4	4	4		1
Subgenus Cryptomastix	5	8	10	1	6
Genus Allogona					
Subgenus Allogona	1	2			
Subgenus Dysmedoma	2	2	2		
Genus Vespericola	2	6	8		2
Genus Ashmunella	1	27	39	14	25
Family VI. SAGDIDAE					
subfamily Sagdinae					
Genus Lacteoluna	1	1			
subfamily Thysanophorinae					
Genus Hojeda	1	1			
Genus Thysanophora					
Subgenus Thysanophora	2	2			
Subgenus Lyroconus	1	1			
Genus Microphysula	1	2	2	1	1
Total of Part 2	81	161	162	36	74
Contents of Part 1	53	188	210	66	97
Total for the two parts	134	349	372	102	171

These volumes are spans in the bridge that will easily carry the student of North American mollusks from the distant 1885 to the present without going through the gigantic task of bridging the gap personally.

I am sure that all of us pursuing this branch of science will voice gratitude and appreciation to him, his associates and the powers that be at the Academy of Natural Sciences of Philadelphia for the service that they have rendered us.

PAUL BARTSCH

U. S. NATIONAL MUSEUM

[1] 1940. Monograph No. 3. The Academy of Natural Sciences of Philadelphia. pp. vi + 575–994, index, ix pp., 203 text illustrations, about 1,500 figures. $7.50 to subscribers of complete set; separate, $10.00.

THE NATIONAL ACADEMY OF SCIENCES

ABSTRACTS OF PAPERS

(*Continued from page 484*)

The ballistocardiograph, a new means of investigating the heart and circulation of man: ISAAC STARR (introduced by A. N. Richards). When physics and chemistry changed from descriptive and qualitative methods to quantitative methods, the rate of advance was tremendously accelerated. The investigation of disease has been largely descriptive and qualitative up to the present time, but there has been an ever-increasing group of workers attempting to design and apply quantitative methods to the host of problems encountered in the clinic. This presentation is a progress report of an attempt to get quantitative information about one of the commonest problems in medicine, the question of the strength or of weakness of the heart and circulation. The heart is a pump and to properly assess its function the amount of blood pumped per unit of time must be known. Methods designed to estimate the cardiac output of man have been developing since 1909. The field has been handicapped by the impossibility of testing methods by estimating known quantities, but the best methods now yield consistent results, and agree fairly well with one another. But all these methods, either because of the need for cooperation on the part of the subject, or because they incited fear or caused discomfort or pain, or because of the laboriousness of the procedure, have not been suitable for routine use in the clinic. The ballistocardiograph is suitable for such use, for it requires nothing of the subject save that he lie relaxed on the table and rough estimations of cardiac output can be made by the operator in a few minutes. The apparatus consists of a table suspended from the ceiling on wires and braced to prevent motion in any but the longitudinal direction. Motion in that direction, opposed by a strong spring, is magnified several thousand times and photographed. When a subject lies on the table it moves in time to the beating of his heart. The forces producing this motion are chiefly the recoil as the blood starts headward when the heart contracts, and the impact as this headward motion is arrested at the aortic arch and pulmonary bifurcation. Unfortunately the resultant of these forces is not perfectly reproduced in the record, for they pass through body tissues which, jelly-like, quiver for a brief instant after receiving a single blow. Therefore after-vibrations warp the latter part of the record, but they have much less effect on the early waves and from this part reasonably reliable data can be obtained. For this and other reasons I do not believe that the method will ever be one of the highest precision; its importance is in the ease of its application and in the fact that it gives to clinicians some knowledge of fundamental facts of cardiac function about which the ordinary clinical methods leave them ignorant. Evidence has been secured that the size of the early ballistic waves is related to the output of the heart, that their shape is conditioned by the changes in the velocity of blood during its ejection from the heart. Normal standards have been ascertained by examination of over 300 normal subjects. The method makes possible the routine examination of patients and provides evidence of cardiac health or disease of a type not available before. It will also detect abnormalities of the circulation not associated with heart disease, a condition which has often entirely escaped detection heretofore. The method is particularly adapted to assessing changes in cardiac function in single individuals. Experiments have been carried out on the effects of exercise, drugs and other therapeutic agents on cardiac function, and also on the development and healing of disease.

The interaction of tones in the ear: ERNEST G. WEVER. When two or more tones are applied simultaneously to the ear they interact in a complex manner and give rise to phenomena not represented in the physical stimuli. Some of these phenomena—beats, combination tones and masking—have already been recognized in subjective observations. A new phenomenon, called tonal interference, is revealed by the electrical responses of the cochlea. Tonal interference appears as a reduction in the magnitude of response to a given tone due to the presence of another tone. It is distinct from masking: it has a different locus in the auditory mechanism, and it occurs for tones of any frequency. An experimental analysis shows the character of the interference process and its relations to the stimuli; and, more generally, it gives insight into the nature and order of events in the cochlea in response to sound. The experiments were carried out in collaboration with C. W. Bray and M. Lawrence.

The rôle of the carotid and aortic bodies in the defense of the mammalian organism against oxygen lack: CARL F. SCHMIDT and JULIUS H. COMROE (introduced by A. N. Richards). The carotid and aortic bodies consist essentially of glomus tissue, *i.e.*, they are structures in which arteries break up into thin-walled sinusoidal spaces devoid of muscular coat and in which the pressure must be close to the arterial level. The walls of these spaces contain abundant nerve endings, and the specialized function of the structures depends on the fact that these nerve elements are stimulated by certain changes in the chemical composition of the blood, giving rise to reflexes that strongly stimulate the medullary centers (respiratory, vasomotor, cardioaccelerator, cardioinhibitory); under some circumstances generalized motor activity of the central nervous system (convulsions) may thus be produced. The stimuli by which the chemoreceptors are stimulated include all the conspicuous changes produced in the blood by increased metabolic activity, *i.e.*, increased carbon dioxide tension, decreased oxygen tension and increased acidity. A considerable number of drugs can also stimulate them; most of these can be grouped in two categories: first, those that turn the balance between the demand of tissues for oxygen and the available supply of it in the direction of a deficiency of oxygen (inhibitors of oxidations such as cyanides and sulfides; stimulators of metabolism such as dinitrophenol and dinitrocresol); second, those that have "nicotinic" actions (nicotine, lobeline, coniine, choline and its derivatives, etc.). The significance of these reflexes to the organism probably depends on their being relatively primitive and undifferentiated survivors in an air-breahting mammal of a reflex system originally intended for orienting a gill-breathing

forbear in an aquatic environment. The neurons of the medullary centers (particularly the respiratory) of terrestrial mammals have developed a highly specialized sensitivity to carbon dioxide, but although some observers have claimed that the chemoreceptors are even more sensitive, the balance of experimental evidence now available indicates that in the normal mammal the chemoreceptors are distinctly less sensitive than the center to carbon dioxide. On the other hand, recent evidence indicates that the center is much less sensitive to H^+ ions, and the chemoreceptors considerably more sensitive to them, than had been supposed; it now seems possible that the H^+ ion does not stimulate the respiratory center directly, the responses to this stimulus being due to the effects of the increased CO_2 tension on the center and to the action of the H^+ ions on the chemoreceptors. One of us (J. H. C.) is now investigating the sensitivity of the respiratory center to carbon dioxide and to acids introduced directly into its tissues; so far, although carbon dioxide has regularly stimulated the center, acids (hydrochloric, lactic) have shown no signs of a similar capacity, but the experiments are still in progress and no final statement can be made at this time. The chemoreceptors are definitely responsible for most if not all of the stimulant effects of oxygen deficiency (the hyperpnea, hypertension and tachycardia and perhaps the convulsions also); this is also probably true of the corresponding effects of nicotinic drugs, excepting the hypertension that such drugs can produce by ganglion stimulation. Thus these reflexes are responsible for most of the organism's defense against anoxia; as far as is now known, the direct effects of anoxia on structures other than the chemoreceptors is a depressant one; resistance to the depressant effects of anoxia is probably the most important attribute of this reflex system, and this is probably referable to the relatively undifferentiated state of the chemoreceptors. When the specialized sensitivity of the central neurons is reduced (as by anesthesia) the control of breathing may revert to the primitive aquatic type and be carried out by the chemoreceptors, responding to deficiency in the oxygen tension of arterial blood rather than to increase in the CO_2 tension; under such circumstances relief of anoxemia may cause respiratory failure. In some cases of sudden relief of long-standing tracheal obstruction and perhaps of sudden increase in the oxygen intake by aviators at high altitudes, collapse and unconsciousness ensue, perhaps for a similar reason.

Some effects of low concentrations of copper salts on the mammalian red blood cell: MERKEL H. JACOBS and W. D. JONES. It was previously reported by Jacobs and Corson that concentrations of copper salts of the order of magnitude of 10^{-5} molar, or even considerably less, have a highly characteristic inhibiting effect on the hemolysis, in solutions of glycerol, of the red blood cells of certain mammals, especially man. This effect has been further investigated by a non-hemolytic method involving osmotic volume changes of the cells under more normal conditions, and has been shown to be essentially one of cell-permeability to glycerol. Though it can be imitated in some respects by salts of mercury, in others it seems to be unique, and it suggests a possible delicate non-chemical method which might be used under certain conditions, yet to be exactly defined, for the detection of traces of copper. The available evidence indicates that the action of copper is at the surface of the cell rather than in its interior; the minimum amounts required are so small that only a fraction of the cell surface could be occupied by copper atoms at any one time. Within the limits of accuracy of the method, the effects of copper seem to be practically instantaneous; by photographic recording the full degree of inhibition of osmotic swelling can be shown to appear in less than a second. At the concentrations used the effects are also rapidly reversible, either by washing the cells, diluting the external medium beyond a certain critical point, raising the pH (with results that differ with different species) or, most conveniently, by the addition of a trace of serum or of hemolyzed cells. The latter method is well suited to photographic recording, and permits the demonstration of a restoration of the normal permeability of copper-treated cells in as short a time as one second.

A comparison between splenic and normal erythrocytes: ARTHUR K. PARPART (introduced by E. N. Harvey). One of the chief functions of the spleen is the storage of blood cells. Previous experimental work has suggested that erythrocytes, thus stored, undergo degenerative changes. The nature of these alterations was not known. Recent investigation has clearly demonstrated that erythrocyte degeneration in the spleen is associated with marked changes in the red cell membrane. A comparison has been made between the permeability of erythrocytes from the splenic reservoirs and those from the normal circulation. The permeability to lipid-soluble and lipid-insoluble compounds and to ions has been found to be much greater in the case of red cells stored in the spleen. These observations suggest that there must be some changes in either the chemical composition or the molecular configuration of the red cell membrane, or both. Lipid analyses have shown that the total lipid content of the membrane decreases. At the same time the lipoprotein complexes in the membrane are decreased. These data have an interesting bearing on the relation between permeability and the chemical composition of the red cell membrane. They are the first records of a normally occurring change in the membrane composition which is correlated with a change in permeability. Previous experience with variations of lipid content of red cell membranes in relation to their permeability made it reasonable to expect that the decrease in lipid content of splenic red cells would not have affected their permeability so markedly. There remains the, as yet uninvestigated, possibility that the orientation of the molecules in the red cell membrane is an important factor in the altered permeability of splenic red cells. Investigations are in progress concerning the enzymatic agent which is responsible for the changes in the chemical composition of red cells stored in the spleen.

Pituitary diabetes in the cat; recovery after insulin treatment: F. D. W. LUKENS and F. C. DOHAN (introduced by A. N. Richards). Pituitary-diabetes is the permanent diabetes produced by the injection for a few weeks of crude saline extract of anterior pituitary glands.

This was first described by Dr. F. G. Young, of London, who used normal dogs; he could not make normal cats diabetic. We have likewise failed with the intact cat, but have found that by the removal of part of the pancreas (leaving enough to prevent any signs of diabetes), this species is rendered susceptible to pituitary extract. A number of permanently diabetic cats have thus been prepared. They manifest the same type of diabetes observed in the dog as measured by the blood and urine sugar, but the pancreatic islands (the source of insulin) present a type of abnormal appearance (hydropic degeneration) which is different from that in the dog (atrophy). In the cat anatomical and functional restoration of the islands takes place under insulin treatment, and the recovery of the animal is maintained after the withdrawal of insulin. Recovery does not occur in animals in which the diabetes has lasted for five months, and no recovery has been reported in pituitary diabetic dogs treated with insulin. The relation of various factors to the recovery of damaged islands of the pancreas in the diabetic animal can thus be studied. Species difference, the type of anatomical disorders, the duration and severity of the diabetes and the variations of treatment are under investigation.

The tetramite stage of Orthopteran auxocytes: C. E. McCLUNG. During the development of the male germ cells of the grasshopper a critical stage is reached during which equivalent contributions by the male parent and the female parent are brought into intimate physical contact and there react upon each other so as to bring about new combinations in the character controls of the two. This seems to be the most significant feature of biparental reproduction, and every detail of the phenomena of germ cell production at this time is of great theoretical importance. Because these details concern very minute elements of the cell exact determinations of their behavior are difficult to arrive at. It is, however, now generally agreed that the chromosomes, the cell elements which carry the material genetic controls, are greatly elongated and lie parallel with homologous regions apposed. Just how the exchange of units, representing genetic controls, is accomplished, is not completely understood. One significant stage of the process is of very short duration and has not previously been described. At this time the four strands of each chromosome, two from each parent, lie extended and parallel with each other, without the presence of any of the so-called chiasms which have been credited by some as the means by which these threads are held in contact. Various other assumptions of "attraction" and "repulsion," "precocity," etc., are definitely disproved by the existence of the "tetramite," a chromosome in the form of four parallel threads.

Biographical memoir of Harvey (Williams) Cushing: W. G. MACCALLUM.

Biographical memoir of Calvin Blackman Bridges: T. H. MORGAN.

Biographical memoir of Arthur Edwin Kennelly: VANNEVAR BUSH.

Biographical memoir of Floyd Karker Richtmyer: HERBERT E. IVES.

Biographical memoir of Albert Sauveur: REGINALD A. DALY.

SPECIAL ARTICLES

ATTENUATION OF CELL STIMULATING BACTERIA BY SPECIFIC AMINO ACIDS[1]

FACTORS influencing virulence have been studied as part of a larger program aimed at clarifying the means whereby the crown gall organism, *Phytomonas tumefaciens* (Smith and Town.) Bergey *et al.*, incites diseased growth in plants. After a considerable range of toxic substances and unfavorable conditions failed to change pathogenicity, glycine proved effective. Attenuation was accomplished by 20 to 30 transfers in a mannitol nitrate mineral salts medium containing .1 to .3 per cent. glycine adjusted to pH 6.8. The amount of glycine was increased gradually in successive transfers, according to the tolerance of the culture, so that growth was slow. Attenuation was considered complete when puncture inoculations into tomato failed to induce crown gall. Several original strains have been kept in culture for over ten years without loss of virulence. Mechanically picked single cell cultures were isolated at the beginning, at various intermediate stages and at the end to avoid any differential selection in an originally mixed bacterial population.

Some attenuated cultures when placed on yeast infusion mannitol medium regained virulence within a year. Others remained attenuated even after four years. The permanency of attenuation was partially dependent upon the number of transfers in glycine medium after attenuation.

The reaction of the medium affected the rate of attenuation. A medium at pH 8.0 was inhibitory and readily attenuating, while one at pH 5.0 was not.

Various other compounds having structural similarity to glycine have also been employed. Among over 50 compounds most of the amino acids were included. With the exception of dicyandiamid (which gave only partial attenuation) and the dipeptide of glycine, all the attenuating compounds were amino acids. These were: glycine, alanine, serine, alpha amino n-butyric acid, threonine, valine, norvaline, methionine, leucine, norleucine, isoleucine and lysine. Their relative effectiveness in mannitol-nitrate-mineral-salts solution is indicated in Fig. 1. Only racemic mixtures of opti-

[1] Published with the approval of the director of the Wisconsin Agricultural Station. This work was supported in part by the International Cancer Research Foundation and the Wisconsin Alumni Research Foundation. Assistance in testing these materials was furnished by the personnel of the Works Projects Administration, official project no. 65–1–53–2349.

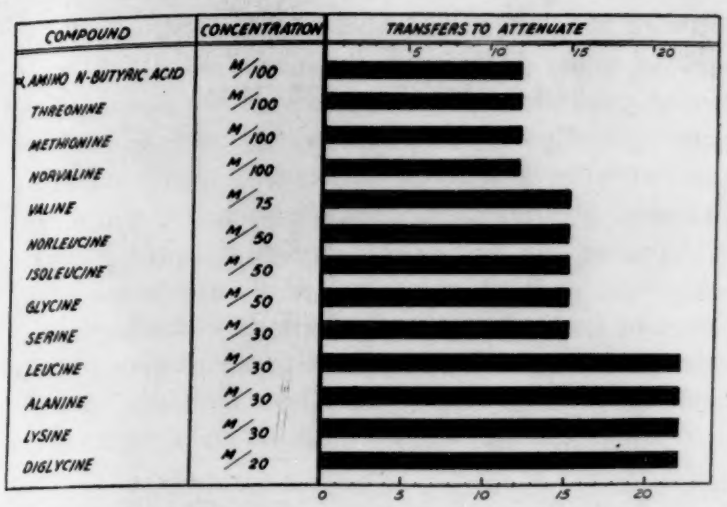

FIG. 1. Attenuating compounds, concentrations used in mannitol-nitrate-mineral-salts medium, and number of successive transfers necessary to attenuate single-celled virulent crown-gall cultures. The concentrations given were the highest used.

cally active amino acids were studied except with leucine. In this case both the l- and dl-compounds were found active. Except for phenylalanine there was direct correlation between inhibition of bacterial growth and attenuation.

Thus all the attenuating amino acids were aliphatic in nature. With the exception of lysine they contained only single amino and carboxyl groups. The other diamino mono-carboxylic acids, the mono-amino di-carboxylic acids and the cyclic amino acids were inactive. Although glycine was active, the ethyl ester of glycine, the anhydride of glycine and sarcosine were inactive. This indicated that the free amino and carboxyl groups might be required for attenuation. Also since diglycine was less effective than glycine and triglycine was inactive the length of peptide chain appears influential.

Glycine and alpha amino n-butyric acid did not specifically inhibit glucose or succinate dehydrogenase, aspartic acid deaminase or aerobic respiration in the Warburg respirometer. The active amino acids likewise did not specifically inhibit the peptidases splitting leucylglycine, leucyldiglycine or alanyldiglycine.

Over 1,000 attenuated cultures have been produced during these studies.

The details of these investigations will be published elsewhere. Meantime, this preliminary statement is given because of its bearing on such basic problems as (1) the attenuation of pathogenic bacteria, (2) the physiological specificity of the amino acids and (3) the mechanism of atypical and pathological cell growth.

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LOCALIZATION OF CHOLINE ESTERASE IN NERVE FIBERS

RECENT investigations have revealed that choline esterase is highly concentrated in all nerve fibers, but rises to strikingly high concentrations at synapses and motor end plates.[1,2] Previous observations on the superior cervical ganglion of cats, after section of preganglionic fibers, and on denervated muscles of guinea-pigs[3] suggested strongly that the enzyme may be concentrated at or near the surface of nerve cells. In these experiments the concentration in preganglionic fibers inside the ganglion appeared to be several times as high as the concentration in the same fibers before they enter the ganglion. This increase was interpreted as possibly being connected with the increase of surface due to the extensive end-arborization of preganglionic fibers in this ganglion.

Direct evidence that choline exterase is highly concentrated at or near the surface of nerve fibers has now been obtained. The enzyme activity has been determined separately in the axoplasm and the sheath of the giant fiber of the squid (*Loligo paealii*). The method used was the Cartesian diver technique as developed by Boell, Needham and Rogers.[4]

Practically the total enzyme activity is found in the sheath, whereas the amount of enzyme present in the axoplasm is negligible. The figures obtained in one experiment are given in Table 1.

TABLE 1

	Material in mg fresh weight per diver	Output of $CO_2 \times 10^3$ cmm in 160 min.	$Q_{CH \cdot E \cdot}$* (average)
Whole axon	0.123 0.123	53 69	0.150
Sheath	0.09 0.09	135 115	0.420
Axoplasm	0.20 0.20 0.20	8 28 18	0.027

* $Q_{CH \cdot E \cdot}$ = mg. ACh split by 100 mg tissue in 60 min. t = 27.5° C.

As at least 80 to 90 per cent. of the sheath is connective tissue,[5] the values obtained for the sheath have to be multiplied by at least 5 to 10 times. The enzyme concentration may be actually much higher than the activity per unit of tissue weight indicates,

[1] D. Nachmansohn, *Bull. Soc. Chim. biol.*, 21: 761, 1939.
[2] D. Nachmansohn, *Yale Jour. Biol. and Med.*, 12: 565, 1940.
[3] R. Couteaux and D. Nachmansohn, *Proc. Soc. Exp. Biol. and Med.*, 43: 177, 1940.
[4] E. J. Boell, J. Needham and V. Rogers, *Proc. Roy. Soc.*, (B) 127: 322, 1939.
[5] Personal communication from F. O. Schmitt. See also figure in Bear, Schmitt and Young, *Proc. Roy. Soc.* (B) 123: 496, 1937.

because the enzyme may be localized in a small fraction of the remaining volume. The figures found for the activity of the total giant fiber are, as could be expected, intermediate between those for the sheath and those for the axoplasm.

The experiments bring evidence for the high concentration of the enzyme at or near the surface of the nerve cell. They suggest that the activity of nerve cells is connected everywhere at or near the surface with the metabolism of acetylcholine and that the phenomenon is only quantitatively more important at synapses. This would explain the findings of Lorente de Nó[6] that acetylcholine can be liberated from fibers as well as at synapses and is compatible with the conclusion of Gasser and Erlanger[7,8] that conduction of nerve impulses along fibers and across synapses differs only quantitatively.

We are greatly obliged to Dr. H. B. Steinbach for the dissection of the fibers.

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FELINE PELLAGRA[1]

IN recent years, a large number of investigators have shown that nicotinic acid is essential for the health and well being of dogs,[2,3,4] pigs,[5] monkeys[6] and human beings,[7,8] but so far as we have ascertained no studies have been reported of its role in the nutrition of cats.

The present communication describes typical symptoms of nutritional deficiency in cats which are relieved dramatically following a daily oral dose of 80 to 100 milligrams of nicotinic acid.* Each of the six cats studied had lost weight and refused food. They appeared weak, sluggish, apathetic, and usually the head hung much lower than the rest of the body. They made no effort to move even when poked, and offered no resistance to hyperextension of the mouth and other physical manipulation. Examination of the oral cavity presented a peculiar yet typical appearance, characterized by an ulcerated, reddish margin in the upper part of the palate close to the midline, and a tongue that was very red over the terminal portion. Thick saliva of an extremely foul odor drooled from the mouth. Each animal had an elevation in temperature of around 3 to 5 degrees.

Within 48 hours following the administration of nicotinic acid, there was a return of appetite, subsidence of symptoms and disappearance of the oral lesions, and the temperature became normal.

The following representative case history describes the symptoms of feline pellagra and illustrates the dramatic response of an affected cat to nicotinic acid therapy.

A fourteen-month old male cat was brought to the veterinarian on August 10, 1940. For two days he had refused all food, had slept most of the time, and had remained in one place unless forced to move. His temperature was 105.8° F. The tongue was fiery red in color. The anterior border of the tongue showed an area about ½ inch wide of ulceration and congestion. There was slight congestion and a few small ulcers in the throat. A small amount of thick saliva drooled from the mouth.

This animal was given orally 80 milligrams of nicotinic acid for two days, at the end of which time the tongue began to clear, his throat became normal and the drooling ceased. He began moving around in the cage voluntarily. By the third day, the tongue had resumed its normal color, and the cat appeared normal in every way. He drank milk and was able to eat canned food. He was dismissed from the hospital at this time, and a daily oral dose of 30 milligrams of nicotinic acid was prescribed for the next four days.

Summary. The present communication describes a deficiency disease in cats which responds promptly and dramatically to the administration of nicotinic acid.

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STRUCTURE–PROTEINS

IT is generally believed that fibrous protein molecules are found only in tissues having a mechanical function, like hair (keratin), muscle (myosin), tendon (elastin). Most of the other proteins studied have been found to be globular.

The globular shape entails a certain mobility; the rod shape an ability to form solid structures. Accord-

[6] R. Lorente de Nó, SCIENCE, 91: 501, 1940.
[7] H. S. Gasser, *Jour. Neurophysiol.*, 2: 361, 1939.
[8] J. Erlanger, *Jour. Neurophysiol.*, 2: 370, 1939.
[9] This work was made possible by a grant of the Dazian Foundation.
[1] From the Department of Internal Medicine, University of Cincinnati, Cincinnati, Ohio; the Department of Medicine, University of Alabama, and the Hillman Hospital, Birmingham, Alabama: these studies were aided by a grant from Anheuser-Busch, Inc.
[2] H. R. Street and G. R. Cowgill, *Proc. Soc. Exper. Biol. and Med.*, 37: 547, 1937.
[3] C. A. Elvehjem, R. J. Madden, F. M. Strong and D. W. Woolley, *Jour. Biol. Chem.*, 123: 137, 1938.
[4] W. H. Sebrell, R. H. Onstott, H. F. Fraser and F. S. Daft, *Jour. Nutrition*, 16: 355, 1938.
[5] H. Chick, T. F. Macrae, A. J. P. Martin and C. J. Martin, *Biochem. Jour.*, 32: 10, 1938.
[6] L. J. Harris, *Biochem. Jour.*, 32: 1479, 1938.
[7] P. J. Fouts, O. M. Helmer, S. Lepkovsky and T. H. Jukes, *Proc. Soc. Exper. Biol. and Med.*, 37: 405, 1937.
[8] T. D. Spies, Clark Cooper and M. A. Blankenhorn, *Jour. Am. Med. Asn.*, 110: 622, 1938.
* Supplied through the courtesy of Merck and Company, Rahway, New Jersey.

ingly, we think that wherever nature needs a mobile protein (serum albumin and globulin, secretions like milk-proteins, hormones like insulin, different enzymes, etc.) it applies the globular shape, and wherever it wants to build a solid structure it applies the rod shape. Proteins have been found to be mostly globular because unconsciously the mobile and more easily accessible proteins have been selected for study. The fibrous nature of proteins, having a mechanical function, has been recognized not because these are the only fibrous proteins, but because the mechanical function conditions a coaxial arrangement of the molecules, which arrangement makes the rod shape easily detectable.

If an animal tissue, like kidney, is extracted with weak saline, the mobile, globular proteins go into solution making about one third of the total protein. The remainder is insoluble in weak saline and represents the morphological structure, the solid edifice of the cell. This part of the protein is fibrous, as can be demonstrated by the intense double refraction of flow. In most tissues about half of this structure-protein can be brought into solution by extraction with Edsall's fluid (0,6 m KCl, 0,01 m Na_2CO_3, 0,04 $NaHCO_3$) containing 30 per cent. urea. The viscous, thixotropic protein can be precipitated by diluting (1:5) and neutralizing the solution. The protein, extracted in this way, seems to form a definite fraction analogous to myosin. The protein also contains P in quantities comparable to the P of vegetable viruses. The rod shape and P content of these proteins invalidates two of the arguments brought forward for the oxogenous nature of certain viruses. Chloroplasts also contain fibrous proteins. The remainder of the protein, representing about one third of the original, can be brought into solution by treatment with 2 per cent. NaOH containing 30 per cent. urea at 60°. This fraction also shows a marked double refraction of flow.

By squirting the urea-salt solution into water the proteins can be pulled into threads, which, after drying, can be studied röntgenoscopically. The first measurements indicate that they are built on the same pattern as myosin or keratin.

Globular proteins, if treated with urea-salt or urea-NaOH give no double refraction of flow (serum albumin and globulin, casein, ovalbumin, lactalbumin, gelatin, edestin).

This research was sponsored by the *Josiah Macy Jr. Foundation,* New York. Detailed report will appear elsewhere (*Enzymologia*).

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

DOUBLE-STAINING IN TOTO WITH HEMATOXYLIN AND EOSIN

A METHOD of double-staining *in toto* with hematoxylin and eosin has been devised primarily for vertebrate embryos, but has also been applied to various vertebrate and invertebrate tissues with equal success. It is simple, reliable and a great time-saver when large numbers of sections, especially serial sections, are required. Furthermore, it eliminates the danger of losing any of the sections, which might easily occur if these were stained on the slide.

By using a modification of Ehrlich's hematoxylin as a toto-stain I have obtained excellent results with both embryological and histological materials of sizes up to 1 cm in diameter. The formula is as follows:

Ehrlich's hematoxylin, stock solution	8 cc
50 per cent. alcohol	30 cc
Glacial acetic acid	2 cc

This staining solution is highly penetrating, does not overstain and gives a practically pure nuclear stain if it is followed by a proper washing with very weak acetic acid. The entire procedure involved in this double-staining method is outlined below:

(1) Fix embryos or pieces of tissue in Bouin's fluid for 1 to 3 days, according to size. Wash and preserve in 70 per cent. alcohol.

(2) The yellow color in the tissue is removed by soaking in several changes of 70 per cent. alcohol saturated with $NaHCO_3$ or $KHCO_3$ (allowing about one hour for each millimeter of tissue). Then wash out the bicarbonate in 50 per cent. alcohol for one or more hours.

(3) Stain in 20 vols. of modified Ehrlich's hematoxylin for 2 to 5 days (about one day for 2 mm of tissue). Shake from time to time to insure uniform penetration of stain from all sides of tissue.

(4) After rinsing in water, soak tissue in several changes of 30 per cent. alcohol containing 0.5 per cent. acetic acid to extract the excess stain (about one hour for each millimeter of tissue). The last change of acetic alcohol should remain practically colorless after the tissue has been in it for half an hour.

(5) Slow running tap water overnight.

(6) Dehydrate through alcohols of 30, 50, 70, 85 and 95 per cent., 6 to 24 hours in each grade.

(7) 95 per cent. alcohol with 0.3 per cent. eosin (alcohol-soluble), 12 to 24 hours.

(8) Absolute alcohol with 0.3 per cent. eosin, 12 to 24 hours.

(9a) For small embryos and soft tissues, clear in chloroform by the sinking method as follows:

In a small dish or a wide shell vial, pour a layer of chloroform on the bottom and then a layer of absolute alcohol with eosin on top of it. Next, place the embryos or pieces of tissue in the alcohol and allow them to sink slowly into the chloroform; leave for 2 to 6 hours or until they have sunk to the bottom.

(9b) For large embryos and for tissues which become tough or brittle easily, clear in synthetic oil of wintergreen by the sinking method. Then replace the oil with chloroform in similar manner.

(10) Chloroform saturated with paraffin overnight.

(11) Melted paraffin, 2 or 3 baths, 1 to 3 hours in each bath. Embed in the usual way.

(12) Cut sections, attach them to slides by the albumen-water method, and dry for 24 hours or longer.

(13) Put sections in xylol to remove paraffin; bring them to absolute alcohol to differentiate the eosin, then back to xylol; mount in balsam.

Sections made from materials thus prepared are stained sharply and uniformly from center to periphery, and show good color differentiation similar to those stained on the slide. Among the tissues tried were pieces of Nereis, clam gill, grasshopper testis, Amphioxus, salamander liver and stomach, mammalian skin, pancreas, cartilage and growing bone, a 10 mm pig embryo and portions of a young shark having a diameter of 14 mm. Equally good results were obtained for all of them. In the grasshopper testis, the metaphase chromosomes and the spindle structure were nicely brought out but, as with the other alum-hematoxylins, except iron hematoxylin, the centrosomes were only faintly stained.

CHAO-FA WU

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STERILIZATION OF SURGICAL INSTRUMENTS BY DI-ETHYLENE GLYCOL

STERILIZATION of surgical instruments by boiling water involves disadvantages: the boiling point of water is relatively low; mineral deposits or stains may occur, especially if the water is hard; and there is a tendency for boiling water to dull the edges of cutting tools. Di-ethylene glycol is relatively free from these objections. While it may fume on heating, this is negligible when small sterilizers are used. If an electric sterilizer is set at "low," the temperature of the liquid rises to about 150° C. As its boiling point of 250° C. is approached, it fumes more markedly, but adequate sterilization should be obtained at temperatures where fuming is not apparent. On standing it evaporates very slowly so that only small amounts at infrequent intervals need be added to the sterilizer to keep it full. Di-ethylene glycol leaves neither stains nor deposits on the instruments. It has no appreciable dulling effect on cutting edges. Since it is completely soluble in water, di-ethylene glycol residues may be promptly removed by dipping the heat-treated instruments in sterile water before use. Finally di-ethylene glycol is relatively inexpensive and readily available from chemical supply houses. These observations are based on two years' exhaustive trial with the compound in comparison with many others recommended for sterilization of dental instruments.

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"STUCK" SYRINGES

A SIMPLE and effective method of separating a "stuck" syringe is to place it in a container of concentrated nitric acid completely covering the syringe. Leave it immersed for a variable length of time, a week or two usually being sufficient.

W. J. NUNGESTER

UNIVERSITY OF MICHIGAN

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